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CASTING DEFECTS and their CURE No. 16

Sand Holes in Copper Base Castings

APPEARANCE

Rough holes often containing sand on top surface of casting " as cast ". When due to breakdown of mould, lumps corresponding to the cavity defects will be found.

CAUSE

Loose sand in mould. Sand lacking in green or dry bond. Erosion. Soft ramming. Overbaked core.

REMEDY

Blow out mould cavity carefully before closing mould. Increase strength by adding more new sand or clay binder. Correct gating technique. Increase ramming density. Control temperature in drying ovens.

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Photograph published by courtesy of The Hill Top Foundry Co., Limited, Wednesbury

MODERN FOUNDRY LAYOUT

Photograph shows:
A General View of a Section of a large Iron-foundry. One of the main Distributing Belt Conveyors can be seen, for feeding the Mixed Sand to the Moulders Supply Hoppers.

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J.J.M.

FOUNDRY
TRADE JOURNAL

Vol. 105 AUGUST 7, 1958 No. 2182

Quality—Its Creation and Control

The message carried by a Report* bearing this caption, is that the conventional inspection department should be reorganized, and largely replaced by placing squarely on the shoulders of the operator, the production of components of such a quality that later inspection is nothing more or less than a formality. It is obvious that by doubling up the job of operator and inspector, there will be some loss of production, but the Report insists that by the avoidance of excessive scrap, there will be a favourable financial result.

A noteworthy feature of this system is the inducement of pride of workmanship in the machine operator, as quality and not quantity assumes its rightful place in the order of things. In the early days of mechanized production of moulds, it was usual for the moulding-machine operator to scratch a cross on any rammed-up box, which he suspected as being below standard quality. Three successive crosses stopped production for investigation by the foreman. Nowadays, a machine-moulder can be helped in his quest to secure quality, by the introduction of metallic mirrors at suitable positions. In the foundry industry it has long been the custom to impose inspection all along the line, starting with the pattern, and carrying through with core and mould production, but this never eliminated final inspection.

The system suggested by the Report will not eliminate final " passing," but it could do much to reduce the volume of work to be inspected finally. Radiographic inspection of castings for certain applications will still be essential. Efforts are constantly being made to utilize the information so gained to ameliorate quality by the modification of manufacturing methods. This Report is written in general terms—and rightly so—as it is for each individual factory to study its implications and to apply them insofar as conditions allow.

* "Quality", published by the Institution of Production Engineers, 10, Chesterfield Street, London, W.1; price 10/-

Holman Bros. Accounts

Not many years ago mining machinery in a fairly narrow application was the limit of the activity of Holman Bros., Limited. To-day, states the chairman, Mr. A. T. Holman, there are few industries which the company does not enter in one way or another. Although the business has been in existence for 157 years, the accounts for the year ended March 31, 1958, are the first to be published. They show a reduction in group trading profit from £551,473 to £477,425, reflecting the fall in base-metal prices, increasing difficulties in obtaining import licences in certain countries, and the effects of the credit squeeze.

By re-siting manufacturing units and centralizing the administration overlapping has been eliminated and substantial economies should eventually result, both in manufacturing and office costs. To take care of the future a fully-equipped apprentice school is now centred in a large building which also holds the company's museum.

On the subject of overseas business, Mr. Holman points out that a factor which gives increasing cause for concern is the tendency for buyers in certain countries to demand much longer credit terms and the financing of such business is a continual strain on the exporters' finances. Current abnormal trading conditions made forecasting difficult, though it was hoped that the easing of credit restrictions would have a beneficial effect in the UK.

Group net profit is £221,429 (£268,072) and the dividend is 12 per cent., as forecast when the company was made public a year ago. Fixed assets total £1,230,722 (£1,091,371), and net current assets amount to £3,326,139 (£2,157,464). There are capital reserves of £58,832 (£321,382) and revenue reserves of £1,624,803 (£1,826,712). A sum of £208,980 (£219,838) is set aside for future tax. Commitments amount to £88,500 (£103,400).

In connection with the merging within the Holman group of the two major companies, Holman Brothers, Limited, and Climax Rock Drill Engineering, Limited, the London office of Holman Brothers, at 44, Brook Street, W.1, has now become the London office also of Climax Rock Drill & Engineering, Limited. In Scotland, the two companies will have a joint office in new premises at 20/26, Ashton Lane, Glasgow, W.2.

Working Days Lost in 1957

Weekly rates of wages increased on the average by about 5½ per cent. during 1957 and over 12,750,000 wage earners had their rates increased. Some 434,000 workers had their normal weekly hours reduced. In October the gross weekly earnings of adult male manual workers averaged £12 11s. 7d., compared with £11 17s. 11d. a year earlier.

The total number of working days lost through industrial disputes last year was 8,412,000—the highest since 1926.

The total working population at the end of the year was over 24,000,000, the number in civil employment increasing by 20,000,000 and the number unemployed by 30,000. The demand for unskilled, and, to a lesser extent, for skilled labour decreased, and unfilled vacancies dropped during the year by 43,000 to 236,000.

Mexican Market for Rolls

The Export Services Branch of the Board of Trade, Lacon House, Theobalds Road, London, W.C.1, have issued a report on the Mexican market for rolling-mill rolls. Statistics show it to be a growing market. Last year about 19,000 tons were imported of which this country supplied 1,280 tons, and figured third in the list below the USA and Italy. There is some local competition as one firm, Fundidora de Aceros Tepeyac, of Santa Clara, operates an iron, steel, brass and aluminium foundry. The Report has the reference number COM/14963.

Forty Years Ago

The August, 1918, issue of the JOURNAL carried an article by Mr. A. Campion on the "Influence of Special Elements in Cast Iron." At that time, the "star" addition was vanadium, whilst chromium was not reported on very favourably. Amongst new companies listed in the issue appeared the names of B. Huntsman, Limited, and Edward Matthews, Limited.

Fuel Research Centre

Extensive facilities for test and development work on both solid-fuel appliances and oil-fired equipment have been set up in the new Redfyre Products development centre by Newton Chambers & Company, Limited, at their Thorncliffe Works, near Sheffield. The accompanying illustration shows a general view of the centre in which tests are now taking place. A wide range of domestic and industrial apparatus is examined under strict laboratory conditions, with a view to assessing and improving performance.

Investment Casting of Non-ferrous Metals*

A short survey of the field for non-ferrous precision-investment castings is followed by notes on the salient features from the Author's practice with various groups of alloys.

By E. Weisner

It is a well-known fact that practically all metals and alloys may be precision cast, but it is recognized that there exist differences in castability between one alloy and another. This leads to a concentration on certain materials to the exclusion of others on the grounds that, as a whole, some are more economical than others, which, from the point of view of pure metal costs, might at first appear to be cheaper. In the field of steel compositions this kind of preference is known to foundrymen from experience.

To a degree the same might be said of non-ferrous metals. However, since this group of

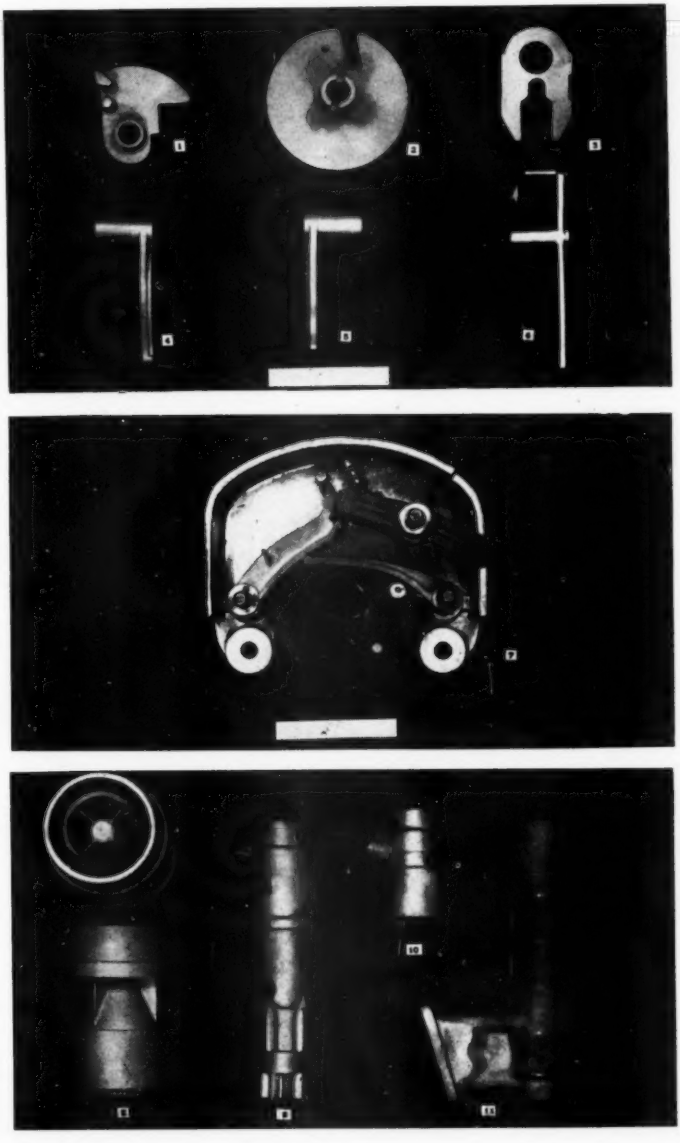


FIG. 1.—*Examples of precision-cast parts.*

Key—(1) Stopper segment; (2) disc; (3) crank piece; (4) disconnecting lever; (5) fishing lever; (6) stopping lever. Material: aluminium-bronze, VBG.

Key—(7) Assembly of parts Nr. 1-6, parts not machined, except for reaming of bores. Application: counter of filling station.

Key—(8) Valve housing; (9) shift roller. Material: aluminium-bronze, VBG.
(10) Torch head; (11) torch head. Material: Tin bronze G Sn Bz 10.

* From the *Proceedings* of the European Investment Casters' Association. The Author is connected with Fürstlich Hohenzollernsche Hüttenverwaltung, Laucherthal.

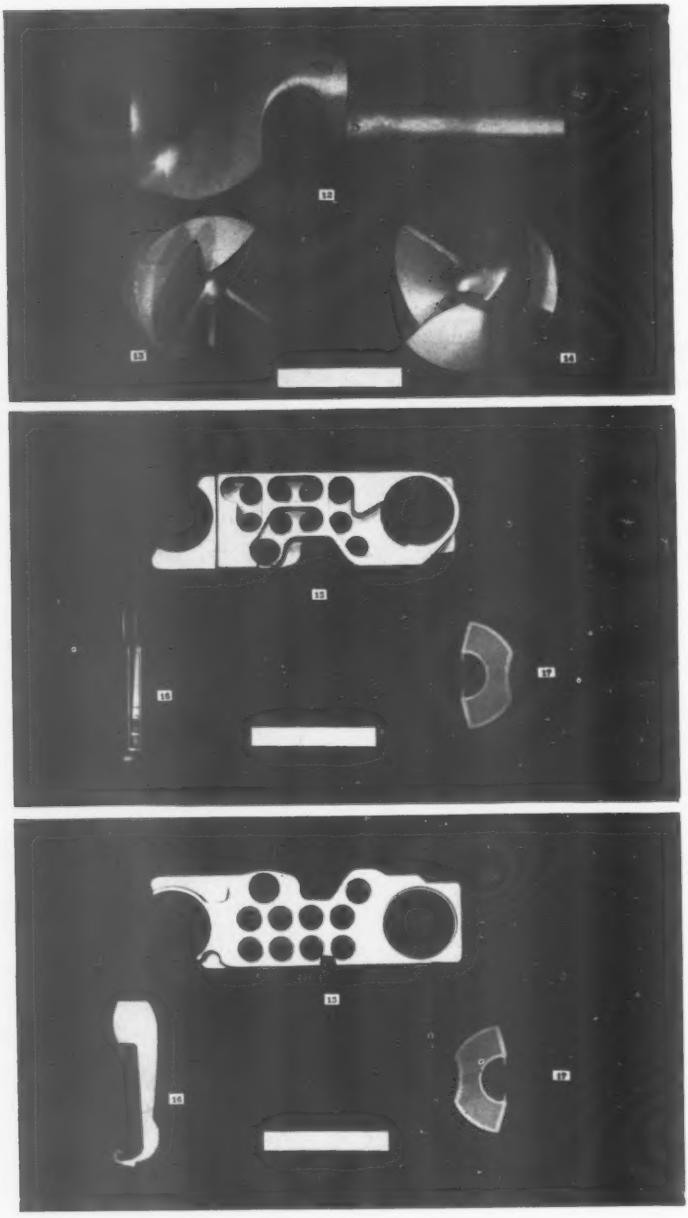


FIG. 2.—*Further examples of precision-cast parts.*

Key—(12) Kneader. Material: 18/8 stainless steel. (13) Pump rotor; (14) pump rotor. Material: aluminium-bronze, VBG.

Key—(15) Housing. Material: Red brass, Rg. 5. (16) Lever; (17) spanner. Material: aluminium-bronze, VBG.

Key—Parts (15), (16) and (17) seen from other side.

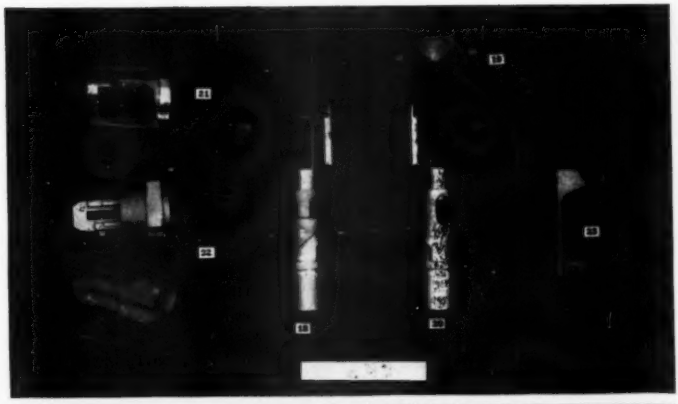
alloys is not so widely used for precision investment casting, the conditions are naturally not known in the same detail, even among foundry experts. Non-ferrous metals are now cast in the investment-casting department of the Author's firm in amount up to about 30 per cent. of the capacity of the works. Hence, a good deal of experience forms the background to what follows, and the Author is in a position to give some practical guidance in the various problems which arise. Examples of castings produced in non-ferrous alloys by the investment process are shown in the accompanying illustrations.

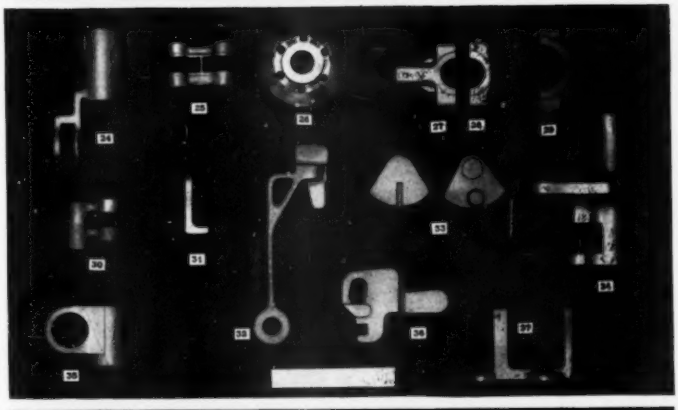
Copper-base Alloys

First, it must be remembered that copper-base alloys occupy the major place among the non-ferrous metals. The firm has also cast aluminium alloys but these are not so well suited for precision casting and, as a rule, there are more economical production procedures which can be applied. This is the reason why aluminium alloys are being cast to a lesser degree than some others.

Copper and its alloys, however, have in general good castability, and good results can be obtained with them as precision investment castings. The specific qualities of the different alloys as manifest in traditional casting procedures (especially sand casting) apply also in investment casting and this point will be referred to later in the Paper. Pure copper can be cast without great complications and, by careful melting practice, it is possible to obtain a conductivity of 52 Siemens units—about 90 per cent. of

the maximum value. Cast tin bronzes and red-brass alloys (Cu, Sn, Zn, Pb) have excellent castability and it is possible





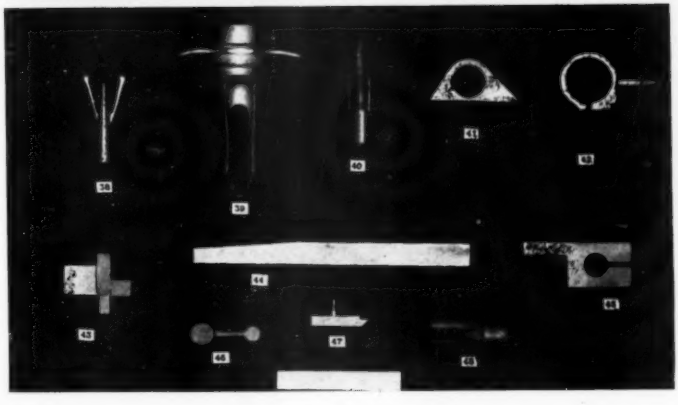


FIG. 3.—*Further examples of precision-cast parts.*

Key—(18) Assembly of parts 19 and 20; no machining. (19) Locking gear; (20) switch tube; (21) housing; (23) lever. Material: Red brass, Rg 9. (22) Housing. Material: aluminium alloy G Al Si Cu.

Key—(24) Fork piece; (25) fishing link; (26) cam wheel; (27) bearing; (28) bearings; (29) bearing cover; (30) hinge lever; (31) slide piece; (32) trigger foot; (33) gripper plate; (34) transfer frame; (35) main part; (36) pivoting plate; (37) bearing mounting. Material: aluminium-bronze, VBG.

Key—(38) Hook; (42) objective clamp; (45) pivoting lever. Material: Red brass, Rg 5 and Rg 9. (39) Housing; (46) control lever; (47) lever. Material: aluminium-bronze, VEG. (40) Contact casing. Material: Brass ZB 68. (41) Button; (43) support; (44) finger; (48) hinge. Material: High strength yellow brass, PB.

with them to obtain even the thinnest sections, down to 0.5 mm. The surfaces, however, appear slightly roughened, particularly in the case of red brass. The Author's firm, it may be mentioned, is continually working in cast tin bronze (of 10, 12 and 14 per cent. tin) as well as red brass (5 and 9 per cent. zinc).

Ordinary and High-strength Brasses

Ordinary brass and other Cu/Zn alloys carrying substantial Zn contents, are somewhat difficult to cast. With these, the high vapour-pressure of Zn is disturbing and gives an unsatisfactory appearance to the surface of the casting. Surface porosity will frequently be found and, to obviate this, it is common practice in the Author's firm to add ingredients to reduce the Zn vapour-pressure. Aluminium additions of up to about 1 per cent. are suitable for this purpose, as is Si, particularly when higher contents of copper are involved. According to German standards, these materials should, more correctly, be called *Sondermessinge, i.e.,* "high-strength yellow brass." This term also covers copper/zinc alloys with additions of some other metals up to 7.5 per

cent. The Author's firm are frequently casting high-strength brass of this kind. In this group of metals, the strength is higher than in the case of straight brasses. In actual fact, these alloys show a pronounced tendency to shrinkage porosity and to avoid this, the firm has to adopt a controlled casting technique, as in normal sand casting.

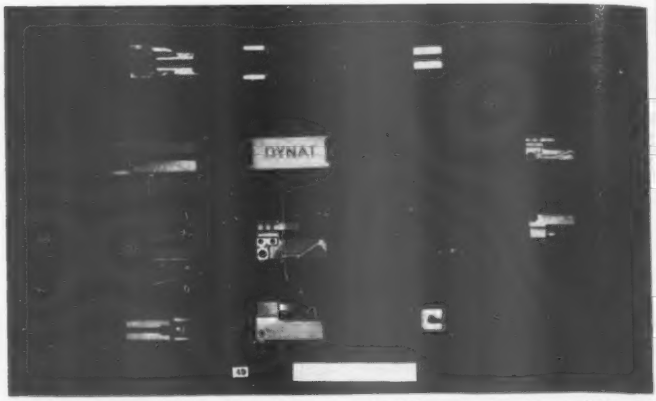


FIG. 4.—*Further examples of precision-cast parts*

Key—(4) Different sizes of parts for zippers. Material: German silver GNs 12.

Key—(50) Ornamental parts for silverware. Material: German silver GNs 12.

Copper alloys with an addition of nickel and zinc, *i.e.*, the nickel-silver or German-silver alloys, are also worked at the Author's firm. Here, the alloy containing 12 per cent. nickel, usually used in the wrought state material, tends to coarse grain and heat cracks and so causes many more difficulties in the foundry than the German silver containing higher quantities (*e.g.*, 20 per cent.) of nickel.

Aluminium-bronze

Aluminium-bronzes which are quite complex alloys are handled in large quantities by the Author's firm. The castings have an excellent surface, smooth and clean. The mould-filling capacity of the material is remarkable and no difficulties are encountered with sections down to 0.8 mm. The strength values of this group of alloys are also worthy of note. The yield strength depends very much on the wall thickness. With a section thickness of 5 mm., a yield strength of 31.7 tons per sq. in. is obtained. However, it is possible to obtain 60 kg. per sq. mm. with a 2-mm. wall thickness. The temperature interval between the liquidus line and the solidus line of the alloy being relatively high leads to a tendency towards the appearance of shrinkage holes. This is overcome by the conventional remedies of normal casting practice, *i.e.*, large risers, feeder heads, ingates, etc.

Demand

There are to-day many branches of industry in which there is a demand for non-ferrous investment castings and non-ferrous precision castings are developing along the same lines as steel investment castings. The more it becomes possible to save machining hours, the more economical will the method be. To give some idea of its wide field of application the following fields supplied with non-ferrous investment castings may be mentioned:—(*a*) manufacture of processing apparatus and instruments, (*b*) chemical industries, (*c*) office machinery, (*d*) sewing machines, (*e*) optical industries, (*f*) engine manufacture, (*g*) camera manufacture, (*h*) electrical engineering, (*i*) telecommunication, (*j*) zip-fasteners, and (*k*) cutlery and silverware.

Board Changes

COZENS & SUTCLIFFE (HOLDINGS), LIMITED—Mr. F. Pickard has been appointed to the board.

FLUIDRIVE ENGINEERING COMPANY, LIMITED—Mr. John F. Perry, chairman of the H. Kaufmann group of companies, has been appointed a director.

EXPANDED METAL COMPANY, LIMITED—Mr. Edgar C. Prentice, general sales manager, and Mr. James B. Close, who is responsible for research and development, have been appointed alternate directors.

Equipment and Supplies

Three-stage Compressor

The new three-stage straight line compressors (Fig. 1) introduced by the Consolidated Pneumatic Tool Company, Limited, 232, Dawes Road, London, S.W.6, are designed for the continuous compression of air or other gases to pressures of up to 0.669 tons per sq. in. with a free air delivery of 242 c.f.m. at that pressure. For operating periods of not more than eight hours, the compressors may be run to give 238 c.f.m. at 0.89 tons per sq. in. In principle the new TCB.3 compressor is a further logical development of the class T design, using a double-acting low-pressure stage, followed by a single-acting, opposed second and third high-pressure stages. The type T frame, common to other units in this class, carries a Timken taper roller bearing supported shaft, two sets of bearings being used to equalize end thrust. A wedge-adjusted connecting rod of forked-end construction transmits the drive to a solid box-type cross-head, which overtravels its guides by

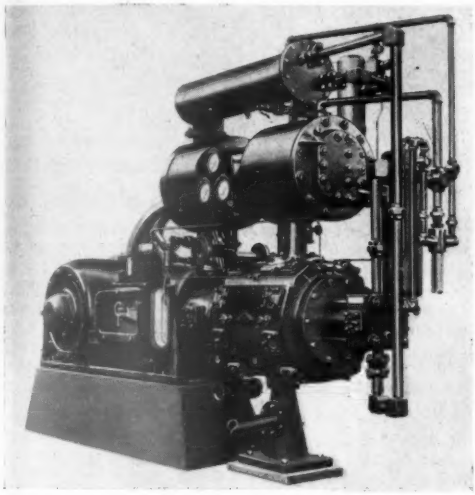


FIG. 1.—*Three-stage straight line compressor for the continuous compression of air or other gases.*

half its length, the cross-head face being ground to fit the bore of the guide exactly and properly grooved for effective lubrication.

A piston rod connects the cross-head and the piston, a stuffing box with steel wipers located in the frame prevents oil from being carried out of the crank case on the piston rod. In the compression section, a double acting first stage piston interposed between second and third stage pistons, acting in opposite directions, gives an almost equally divided load between forward and return strokes.

A hollow reinforced one-piece casting is used for the first and second stage piston, the third stage piston comprising a hardened steel self-aligning plunger. Lubrication of the cylinder is by a force feed lubricator, with separate feeds to the first, second and third stages. This force feed is positively driven from the cross-head, automatically supplying a visible regulated quantity of oil to each cylinder. Metallic packings are fitted where the piston rod passes through the second stage cylinder head.

Transportable Oxygen Plants

Oxygen requirements of engineering works, research establishments and the Services during recent years have shown the need for an easily transportable oxygen producing plant, and British Oxygen Gases, Limited, Spencer House, St. James's Place, London, S.W.1, have now developed a standard range of such oxygen-producing plants which can be easily operated for short or lengthy periods. They can be mounted in a vehicle or on a trailer or on skids for ease of movement. Self-contained with their own diesel engines, they can also be supplied to operate from local electric power supplies. No special skill on the part of the operator is necessary and one or two men, depending on the capacity of the plant, are capable of running it after suitable training. The machinery is compact, safe in operation, easy to maintain and can be operated intermittently or continuously. In order that the plant can be satisfactorily operated, the only requirements are the supply of fuel, lubricating oil, chemicals for the air driers and a little make-up cooling water.

The plant includes a diesel engine, which is a power pack industrial unit complete with all normal accessories, and a multi-stage air compressor driven by Vee belting from the diesel engine. The compressed air is passed through two soda-lime purifiers for the removal of carbon dioxide. The dried air is cooled in two counter-current heat-exchangers by means of the separation products of the process, travelling through the heat exchangers and thereby reducing the air temperature. A figure of 99.5 per cent. purity is normally possible with all transportable oxygen plants. Besides the 1,000 cub. ft. per hr. plant others of 500 and 150 cub. ft. per hr. capacity are also available. For smaller sizes of plant the process is similar in the main but the provision of liquid oxygen with the pump, expansion turbine and nitrogen production facilities are not required.

THE ROBALLO ENGINEERING COMPANY LIMITED, 43 Dover Street, London, W.1, has been granted exclusive marketing rights in Great Britain for a new range of engineering products which are claimed to be revolutionary in design and application. They are the "Roballo" ball-bearing slewing rings and arrangements have now been made for their production in England. Applications of these rings include uses in all types of slewing cranes, excavators, derricks, revolving fire-ladders, turntables, and other equipment requiring a horizontal, vertical or angled slewing action.

FEDERATED FOUNDRIES, LIMITED, 4, Stratford Place, London, W.1, are placing on the market a new boiler, mainly for domestic application, known as the Sofono automatic. It has a maximum output of 28,000 BTU's per hour and has been approved by the Ministry of Power and the Gas Council. The boiler uses about 1¼ cwt. of gas coke per week and will burn for more than 15 hours without special attention. It is fitted with an easily adjustable thermostatic control and introduces several unusual features including a unique convector unit for controlled kitchen temperature (cool in summer, warm in winter); a new silent magnetic outer-door catch; a raised base to prevent heat-loss through the floor; a two-piece bottom grate, and patented close-hinged, drop-down ashpit door, which cannot be left open when the outer door is closed.

A RUSSIAN ORDER for a pair of automatic foundry moulders, designed to produce up to 300 moulds of uniform consistency per hour, has been completed by the Coleman-Wallwork Company, Limited, a member of the J. Stone group.

Tredegar Town Clock

Most towns have a square, the centre of the community's business and social life and it is a poor township that cannot boast a town clock of some shape or form. Tredegar is a little different in this respect, it has a "Circle" in the centre of which stands the town's cast-iron clock, a true hub around which the life of the community revolves. It was in the year 1857, that a number of prominent citizens of Tredegar decided that something must be done to provide the rapidly growing community with the means of knowing the time. It was decided to erect a clock in "the Circle," large enough and high enough to be seen and heard from all parts of the town. Among those interested in this project

FIG. 1.—*Tredegar cast-iron clock is a monument to the "Cast Iron Age," when this versatile metal was put to innumerable applications where durability was one of the primary requisites.*

were Mr. R. P. Davis of Bedwellty House, manager of the rapidly expanding Tredegar Iron Works, and his wife who was largely responsible for its success.

Work on the clock was commenced in September 1858, and the whole erection was completed by the end of the year. The clock is 72-ft. high and is 1,000 ft. above sea level. The foundation is of masonry upon which is placed a square cast-iron base or pediment which has four arms extending some 60 ft. at a mean depth of six inches below ground. Upon this base stands a cast-iron plinth surmounted by a cylindrical column on which rests the clock topped with a weather vane. The plinth is inscribed on the four aspects, on the south side "Presented to the town of Tredegar from the proceeds of a bazaar promoted by the late Mrs. R. P. Davis. Erected in the year 1858," on the west side is an effigy of Wellington with the legend "Wellington England's Hero"; on the north the Royal Arms of England and on the east the name of the ironfounder with his crest, "Charles Jordan, Iron Founder, Newport, Mon."

The clock itself is a 15-in. mainwheel strike with a single four-legged gravity escapement driving the four dials. It has a 1¼ in. second pendulum and the bob weighs two cwt.; the frame is of cast iron, the wheels and bearings of gunmetal and the arbors of steel. The clock was one of the first of a new type to be manufactured and was designed by Mr. J. B. Joyce of Whitchurch, Shropshire, whose grandson, Mr. N. Joyce, maintains the clock at the present time. The new design has a flat frame and is an improvement on the chair frame previously manufactured. The four translucent faces of the clock are each 5 ft. 3 in. dia. The engineer responsible for the design and erection of the clock tower was a Mr. James Watson. The company employed to cast and erect the clock, Charles Jordan, ironfounder, Newport, Mon., is no longer in existence, but the clock they built is as sound to-day as ever, a monument to craftsmen of 100 years ago.

Spencer (Melksham) bid for Stothert & Pitt Capital

A forecast of a dividend of not less than 15 per cent. for the year to September 30, 1958, on the increased ordinary capital of Spencer (Melksham), Limited, if the offer becomes unconditional is contained in the offer by Philip Hill, Higginson & Company, on behalf of Spencer (Melksham), for the capital of Stothert & Pitt, Limited, engineers and ironfounders, etc., of Bath. The payment for 1956-57 was 12½ per cent.

The terms of the offer of Spencer (Melksham) are £1 of 6¼ per cent. debenture stock 1978-83 for each 5 per cent. £1 Stothert & Pitt preference and two 10s. ordinary shares plus £1 of the debenture stock for each Stothert & Pitt £1 ordinary, with an accompanying offer by Philip Hill, Higginson & Company to purchase for cash at par any of the debenture stock accepted if the Spencer (Melksham) offer becomes unconditional.

The Stothert & Pitt directors have stated they were not circulating the offer as they were unable to recommend acceptance, and then advised holders to take no action, if the offer was made direct to them, pending receipt of the board's views. The dividend forecast is subject to unforeseen circumstances and provided that Stothert & Pitt's profits for the year to June 30, 1958, are comparable with 1956-57. The business of Spencer (Melksham) has been maintained during the current year on a satisfactory basis, the directors report. The offer remains open for acceptance until August 22.

APPLICATION to Meriden Rural Council for permission to build a £4,500,000 gasification plant at Coleshill has been made by the West Midlands Gas Board. The site is between that proposed at Forge Mills, and turned down by Warwickshire County Council, and the power station at Hams Hall.

Industrial Conditions in the USA*

By J. D. Harper

In view of the fact that to-day there exists a necessary inter-relationship between the internal economy of the US and that of the UK reliable eye-witness accounts of current trends in the former country possess especial significance and interest for British readers. For foundrymen this is all the more true when the visitor to the US has concentrated his attention on the American foundry trade with particular emphasis on foundry metallurgy and method. In what follows Mr. J. D. Harper reports on both the general economic "climate" and the specific industrial conditions in the US as he observed them last winter.

The writer was lucky enough to spend last winter —from October until March—in the United States. He was mainly interested in studying American foundry metallurgy and methods, and visited nearly 40 foundries as well as a number of research and technical organizations all the way across the continent from New England to California. He deems that to give a talk on "Industrial Conditions in USA" (which was planned while he was still away) is a little presumptive since he was really only looking at one industry and concentrating on certain parts of that. However, whilst there he gained various impressions which it is hoped may be of interest.

Before the visit, the writer had something of a preconceived idea of what he would see, as for instance, huge factories fully equipped with the latest automation techniques for mass production. These certainly exist, but in the foundry industry at least, the majority of the firms are quite small—a jobbing foundry as large as John Harper is quite uncommon. The reason for this appears to be that the cost of transport is so high, and the distances so great that any foundry tends to be limited to a fairly small area for its customers. Even the huge companies—such as some of the motor-car, aircraft and electrical manufacturers—are tending to split up more and more and have small-process and assembly plants in a great number of regions. As in the old pioneer days, the movement is towards the west and the Californian cities, especially Los Angeles, are growing at an enormous rate.

Although it is so big, one tends to think of America as one place, but there are regional differences in the country, in the people—the way they speak and the things they do—and in industrial conditions. Labour is cheaper in the South; raw materials are expensive in the West and so on. On the Pacific Coast the Japanese seem to have a considerable effect. They come across to the States, and buy scrap which forces the prices up for the Americans who are naturally annoyed, especially when the material returns from Japan in finished form to compete with their own products. One instance was related where a gas burner, cast, machined and enamelled was sold by a Japanese firm in America at a lower price than the works cost of the raw casting as made in American foundries.

Raw Materials

As far as the foundry industry is concerned, the raw materials available are much the same as over here. Generally speaking, the phosphorus content of their iron ore is lower than in the UK so that even cheap grey irons often have phosphorus contents as low as the materials used in Europe to make high quality iron—such as Meehanite. This generally benefits the mechanical properties but it also means that the molten iron is less fluid and so must be poured at a higher temperature. As a consequence of this, together with the types of moulding sand used, the surface finish on American castings is not good unless special and expensive techniques are used. It was rare that one ever saw a casting as smooth as those made at Willenhall every day.

The greatest difference in the raw-material situation is that of fuel supplies; particularly oil and natural gas which is piped, often for thousands of miles to almost every city in the country. The way the houses are heated shows this very well. Central heating is the rule, and the boilers are mostly fired with oil and increasingly with gas. In the factories too, gas-fired heaters and furnaces are used far more widely than would be economical in this country.

Standard of Living

The standard of living in America is generally higher than here, although the emphasis is on dif-

* Paper read before a sales conference held at the Willenhall works of John Harper and Company, Limited. The Author recently joined the firm after graduation and extensive practical experience in British and overseas foundries. The portrait reproduced above shows Mr. Harper addressing the gathering.

ferent things. Where a Frenchman would spend his money on a good dinner or bottle of wine, an Englishman perhaps on his house or garden, the American will spend his on a car. It was not uncommon to see magnificent Cadillacs parked outside dilapidated slums. Almost everyone drives his car to work, and at some of the factories visited the parking places were almost as big as the factories themselves. Nobody over 15 years old ever rides a bicycle. Of course it is true that it costs less to run a car there than here—petrol costs from 1s. 6d. to 3s. a gallon for instance; and many cars are bought on hire purchase. One man encountered was paying instalments on the car he was driving *and* on two previous cars which he had sold before completing paying for them.

Other prices are higher, especially of anything that cannot be mass produced (a hair cut costs at least 10s. 0d.) but the man who is paid $4.25 per hour (over 30s. 0d.) is very well off by any standards. This is an exceptional wage, but most piece workers were making at least $3 (21s. 6d.) and one rarely hears of anyone earning less than $1.00 (7s. 2d.).

Most of the places visited were trade union closed shops. Every year or two the union negotiates a new contract with the management (often after a routine of threatened strike and lockout) and generally is in a very strong position. Some had forbidden piece work, and all imposed rigid conditions of rate setting and lay-off procedures.

Many of the foundry workers are negroes who came north and into the industrial regions away from the South where jobs are scarce and racial segregation irksome.

These people are very cheerful and seem to be content to work hard at uninteresting repetition tasks. Skilled moulders on the other hand are rather rare—quite often they are immigrants from European foundries—and tend to become concentrated on to supervision and inspection jobs. A common feature of American foundries is a very high ratio of technicians and foremen to workers.

There are many more University graduates than here, although the standards at some of the smaller universities are much lower than those in Europe or the better known colleges over there, like Yale, Harvard, and the Massachusetts Institute of Technology. Mostly the students pay their own way through college, working in vacations or part time. Some of the cleverer ones get married and let their wives work to pay the college fees!

Mass Production

This whole situation—very expensive rather unskilled labour, and relatively high numbers of technicians—has grown up together with, both as a result and a cause of, a high degree of mechanization. In the forty-odd foundries visited, the extent of mechanization varied from the highly "automated" mass-production lines to the unmechanized hand-moulding sections of some jobbing foundries. Sandslinger plants are particularly common.

Of course, the jobbing foundries—such as this one—where a great variety of work is dealt with, cannot mechanize as much as those making enormous numbers of castings of a few types. Factories such as the motor-car foundries—those of Ford and Chevrolet were inspected—are like a page from a science-fiction novel, with every least operation "automated" to the maximum. The castings have been designed just as much for economy and ease of production as for their use in the finished car. So rapid is the process that sometimes (or so it was related) the cylinder blocks are still warm from the foundry in the finished engine.

Sometimes mechanization seems to have gone too far. It is said that the production procedures forbid the development of a type of car different in anything but detail from the present lines. One machine seen was for closing together the two halves of a mould, an operation previously done by one unskilled man and a hoist. Now there is a full time, highly-skilled electronics engineer keeping the machine in working order. But these cases are exceptional and the continual drive is to find ways to do things more and more quickly and efficiently. Every new development tends to be looked at from this point of view—shell moulding, for example, is judged by the potentialities it gives for mass production rather than for any benefits of quality which it may or may not confer.

Research

This type of attitude tends to extend to the research side as well. Metallurgical (and other) research is done in universities or research institutes on schemes sponsored by industry, which is concerned with production. Only the minority have the foresight or the money to sponsor fundamental types of research. During the stay the Sputniks went up and aroused a popular demand for more research (at least in the newspapers; an immediate impression was that the majority of the people met with were a good deal less perturbed than the leader writers) but this was always for *more* research, or *bigger* laboratories rather than a different type of research. Many scientists encountered were aware of this situation and universities are now increasing their fundamental research facilities. In the meantime the efforts put into development and applied research yield remarkable results.

Commercial Conditions

The questions which most people now ask are about the current recession. This, of course, is still going on and the situation has changed even since the visit, and no one agrees on its seriousness. Most of the people visited, on being asked about it, gave answers best covered by the definition ex-President Truman gave at the time: "It is a recession when your neighbour loses his job, a depression when you lose yours." Some of the foundries were down to three days a week with many people laid off—these were the most pessimistic. Others who were still on full, or over-time (because of some particular market or because of

special technical skills) were inclined to minimize the seriousness of the situation.

Every month, the Gray Iron Founders Institute in Cleveland publishes some statistics, and these include a figure called the Maximum Commercial Demand—that is the largest sales ever made in that area in a month. Thus, the sales volume for December, 1957, varied according to area from 47 to 69 per cent. of this M.C.D. averaging 57 per cent., so it could be seen that the industry was quite hard hit.

Hard though the situation may be for the companies, it is even worse for the men who are laid off or on short time. The major part of each pay packet goes on time or h.p. payments and any stopping of the source of supply can mean the loss of anything from television sets, kitchen ranges, dwelling houses, or worst of all, cars. If unemployment continues, life becomes very hard, since unemployment compensation is small and limited in time—afterwards they have to subsist on charity as best they can.

The whole situation seems to be tied to the car industry, and this is at present in a poor state with thousands unemployed in Detroit. Orders are not likely to increase as there are signs of a revulsion from the huge flashy type of car, and in any case a man who has lost his job cannot pay for a new car.

The writer saw one assembly line, at Fords, making one car every 45 seconds, 24 hours a day.* Somebody, somewhere, has to step forward and buy a car, one every 45 seconds 24 hours a day. And this was only one line, of one company. Although no economist, the writer's view was that a "snowball" reaction, spreading far beyond Detroit, and far beyond America, could easily happen—if it was not already happening.

One hears it said that the worst is already over, that the snowball will never start to roll. Everybody sincerely hopes so. Whether it does or not, the existing conditions have already increased competition enormously, and manufacturers are being driven to more and more sales effort. Some of this effort is directed towards "high-pressure" methods. At the annual Hardware Show in New York, all the stands were equipped with gaudy lights, free cigars, blondes in spangled bathing suits, and the full paraphernalia of the American salesman. Castings hardly lend themselves to this technique and so jobbing foundries are relying on a more technical sales effort, trying to develop products outside the highly competitive grey-iron castings field. The development of nodular (spheroidal-graphite or ductile) iron, for example, is going ahead very fast and it was seen being used for crankshafts, pipe fittings and clamps, agricultural and excavating machinery, gears, valves, hubs and many other applications, exploiting the high strength, shock resistance, ductility, or rigidity than can be achieved in this material. One foundry visited made 70 per cent. of their production in nodular iron, and said that but for this they would have been bankrupted by now.

A visit to some of his actual and potential customers accompanied by a travelling representative of one foundry where the author worked, was characterized by the emphasis the salesman put on discussions with their designers showing them how to modify their schemes for economy of casting costs, and how to use castings in place of more expensive parts made in other materials or by other methods.

In this sort of way this foundry, and many others were developing new applications for castings to replace the work lost as a result of the recession. However prolonged this recession may be, the writer is sure it can be only temporary for after what he saw of the country, with its vast reserves of natural resources and an abundant supply of human energy and initiative, he cannot believe that anything but prosperity lies ahead.

*We suggest this should read 16 hours a day as two-shift working is normal in large mass-production factories in America.—EDITOR.

Credits for ECSC Projects

Distribution of the $50,000,000 loan recently floated on the US capital market has been announced by the High Authority of the European Coal and Steel Community. It is to be divided among 28 projects considered by the High Authority to contribute most effectively to the achievement of the general objectives of the ECSC.

A sum of $28,000,000 will go to coal industry projects, $19,000,000 to steel industry projects, and $3,000,000 to iron-ore mining. The projects aim at modernizing and developing coal-producing installations, development of production of iron ore, development of production of pig-iron in coastal plants, and the improvement of steelworks' installations for the dressing and direct reduction of iron ore. German enterprises are to receive $28,000,000, French enterprises $13,500,000, and Italian and Belgian enterprises, $8,500,000.

Applications for the available funds totalled more than $300,000,000. Of the 28 credits granted, 25 are for 20 years ($45,000,000) and three are for up to five years ($5,000,000). All credits will be made available to the enterprises at par. The 20-year credits carry an interest rate of 5⅛ per cent. and the five-year credits, a rate of 5 per cent. These rates cover only the actual self-cost of the funds to the High Authority.

Appeals on Rateable Fixtures and Fittings

Overhead cranes are not rateable, but high-frequency melting pots, 10-ton arc furnaces, a motor-driven air compressor, and hydraulic pumps and motors are. This opinion was given in a reserved decision by the Sheffield Valuation Court on appeals by Kayser, Ellison & Company, Limited, makers of high-class electrical steels, etc., of Sheffield, and the Sheffield Valuation Officer in respect of the company's steelworks and premises.

Kayser, Ellison had contended that five items of plant were not rateable and had appealed against the valuation officer's proposed figures for 1957. The officer had appealed against the company's proposed figures for 1956. On the suggestion of the chairman, Mr. R. P. Coldwell, amended figures were put before the court and confirmed.

Company News

SHEEPBRIDGE ENGINEERING, LIMITED—Group profit expanded from £394,722 to £435,167 in the year to March 31, 1958, and the dividend is raised from 15 per cent. to 16 per cent., with a final of 11 (10) per cent.

JOHN BROWN & COMPANY, LIMITED—The company is raising its payment from the equivalent of 8.7 per cent., less tax, to 10 per cent., less tax, with a final of 6 per cent. for the year to March 31, 1958. The actual 1956-57 total was 5 per cent., tax free. Group net profits increased to £1,391,960 (£1,347,538), after heavier taxation of £1,944,422 (£1,884,645). The group profit includes that of Constructors, John Brown, Limited, from February 5, 1957, when it became a subsidiary, to December 31, 1957.

DOWTY GROUP, LIMITED—The company is raising the dividend on the £2,400,000 capital from 9 per cent. to 11¼ per cent., tax free, with a final of 6¼ (5) per cent. Profit for the year is £2,018,430 (£1,651,590), subject to tax of £1,089,958 (£859,258), leaving a net profit of £928,472 (£792,332). When the interim dividend was raised from 4 per cent. to 5 per cent. last March, the directors forecast an increase of some 25 per cent. in the profit for 1957-58. They foreshadowed a further increase in turnover for 1958-59.

ASSOCIATED BRITISH ENGINEERING, LIMITED—No final ordinary dividend is recommended by the directors for the year ended March 31, 1958, in view of a sharp contraction in group earnings to £97,792 before tax, from £384,038. An interim of 2½ per cent. has been paid; the total for 1956-57 was 10 per cent. The consolidated account for 1957-58 includes accounts of Mackay Industrial Equipment, Limited, and Blake-Mackay Engineering Company (Africa), Limited, since the purchase of these new subsidiaries was completed on March 28, 1958.

EFCO, LIMITED (formerly the Electric Furnace Company, Limited)—The company is raising its dividend from 12½ per cent. to 15 per cent. for the year to March 31, 1958, with a final of 10 (8¼) per cent. This year's total is on £417,334 ordinary—the 1956-57 interim was on £313,000 prior to a rights issue. Group profit increased from £226,840 to £283,043, and after tax, other than £19,200 (£15,200) on distributions, of £139,615 (£102,957), the balance is £143,428 (£123,883).

QUALCAST, LIMITED—The group has shown considerable progress during the year to June 30, 1958, reports Mr. V. Jobson, chairman. Production is up appreciably, and Mr. Jobson says: "When the official figures are out I think they will show one of the best years in the history of what I will call the old Qualcast group, and to this must now be added the results of the Kaufmann group, which, in the 12 months to December last, are also ahead of the previous year." The Kaufmann group has been associated with the company for six months.

W. G. ALLEN & SONS (TIPTON), LIMITED, colliery, light railway, and mechanical engineers, etc., of Tipton (Staffs)—The company is paying an unchanged 10 per cent. final dividend, making 12½ per cent. for the year to March 31, 1958, as previously, and has declared an additional first interim of 2½ per cent. for 1958-59 in view of the increase in group turnover in the first period of that year. The directors state that if the current year's trading continues to be favourable, they intend to pay a second interim dividend in March, 1959, and a final in September, 1959, as hitherto. Net profit is £52,525 (£53,648).

EXPERT TOOL & CASE HARDENING COMPANY, LIMITED—Mr. S. H. Newman, chairman, was unable at last month's meeting to report the successful completion of the negotiations to which he referred in his annual statement and in a subsequent announcement. It was not in the best interest of the company, he said, to disclose the full nature of these negotiations. It could be said, however, that they involved the disposal of certain assets. Following the board's decision to take this step, negotiations were commenced and a firm cash offer from an intending purchaser was received in April. The prospective purchaser had had difficulty in raising the necessary finance, and this had led to the delay.

A. & J. MAIN & COMPANY, LIMITED, structural engineers, etc., of Glasgow—Balance of trading for 1957 (subject to completion of audit) amounted to £193,510 (£204,031), and the net profit, after taxation of £112,800 (£123,300), to £80,710 (£80,731). It is proposed to repeat the 10 per cent. dividend. Last year a bonus of 10d. per share, free of tax, was paid on the ordinary capital from tax adjustment surplus. The directors also recommend, by the capitalization of part of the general reserve, an issue to ordinary shareholders of one fully paid 6½ per cent. cumulative preference share for every two ordinary shares held, these to rank for dividend as from January 1 last. This issue will amount to £129,646, and will raise the issued preference capital to £198,309, the issued ordinary capital being £259,292.

Edgar Allen's Finance

Interests of the company and its members would best be served by maintaining high liquidity, said Mr. W. H. Higginbotham, chairman, at the annual meeting of Edgar Allen & Company, Limited, the Sheffield steelmakers, on Thursday, July 24. Intensified competition in exports only too frequently involved extension of credit to a degree unknown a few years ago, he said. The hoped for extension of the company's business would almost certainly require considerably more working capital.

On the other hand, the continued impairment and limitation of reserves by price inflation and heavy taxation minimized the effective value in use of the working capital it had. Further, the enhanced cost of replacement of fixed assets was not covered by the depreciation provisions made. To do this, as he contended it should be done, was a matter of legal and accounting difficulties which had still to be overcome.

Mr. Higginbotham said that this enhanced cost, unless provided from reserved profits, might in the future have to be met out of capital introduced from outside, as also would the cost of extensions and development.

Coventry Gauge & Tool to Merge with Rockwell Engineers

Subject to final agreement and CIC consent, the Coventry Gauge & Tool Company, Limited, is to make a formal offer for the £200,000 one-class capital of Rockwell Engineers, Limited (ex a second interim dividend of 7½ per cent. to be declared for the year to July 31, 1958, making 12½ per cent. as previously), of five ordinary 10s. stock units for each four Rockwell shares of 5s. The new Coventry Gauge stock would not rank for the final dividend in respect of the year ending August 31, 1958. At current prices the offer is worth £750,000.

On completion of the merger, Mr. C. E. Rockwell and Mr. J. Middleton, whose families hold a total of approximately 70 per cent. of Rockwell's share capital, would join the board of Coventry Gauge.

"Pioneers in Gas Appliances"

Gothic Works Foundry of R. & A. Main, Limited

The occasion from which the ensuing account has stemmed was the recent visit by members of the Institution of Gas Engineers to the Gothic Works of the G. and M. Group at Edmonton, London. A wide range of activities were inspected and there was a display of some of the many appliances currently in production. The mechanized foundry and enamel shop of R. & A. Main was included in the itinerary and it is to these that the following description is mainly confined.*

On the amalgamation of R. & A. Main, Limited, with Thomas. Glover and Company, Limited, in 1897, the sites of the present Gothic Works at Falkirk (10 acres) and Edmonton (19 acres—now 24 acres) were acquired and the building of new factories commenced. Only two years later, in 1899, Gothic Works, Edmonton, commenced production, and in the following year production also commenced at Gothic Works, Falkirk. To-day the shop area at Gothic Works, Edmonton, alone exceeds 677,000 sq. ft., and Glover and Main, Limited now has a wider interest in the manufacture of gas appliances than any other firm in the industry.

Three examples of the pioneer work carried out by R. & A. Main, Limited, are the simplification of cooker construction in 1922-23, the production of the first, and then only, all-enamelled cooker in 1927; and the production of the first all-sheet-metal cooker in 1935.

Mechanized Foundry

The mechanized foundry in which the company's activities are concentrated covers an area of 23,790 sq. ft. The plant is composed of three sections:—1. Casting bays—(six men casters); 2. Moulding machines—four men to each pair of machines; 3. Sand preparation—five men on each side of knock-out. The casting bays are equipped with two cupolas by Constructional Engineering Company, Limited, and have an output of three tons per hour. The output of the plant when fully employed totals 80 tons good castings per week. Scrap averages less than 8 per cent. The entire cycle of operation takes approximately 20 min.

At the present time the annual consumption of cast iron is approximately 2,500 tons and coke is consumed at the rate of 15 tons per week. The moulding machines are by British Insulated Callender's Cables, Limited, and have an upward squeeze, handling approximately 40 moulds per hr. On the knock-out the castings are separated from their runners and risers and from here the sand returns for reconstitution. The sand-handling equipment and conveyors are by Paterson Hughes Engineering Company. Capacity of the large sand hoppers is 75 tons and of the small new ones 50 tons.

The sand is used continuously, being returned to the storage hoppers *via* conveyor belts equipped with a magnetic separator and vibrating and rotary sieves, which ensure the removal of any metal, etc., from the returning sand. The sand on its outward journey passes through a mill, which ensures complete mixing, and a Royer which disperses any irregularities caused by the mill. Characteristics of the sand used are as follow:—Permeability, 30; green strength, 12 lb. sq. in. moisture, 6 per cent.; coal dust, 6 per cent.

Floor Foundry

The floor foundry has an area of 17,112 sq. ft., with accommodation for over 400 moulding boxes, and is primarily used for castings required in smaller quantities than would prove economic on the mechanized plant. The average quantity of molten metal handled by each moulder per day is ¼ ton. The weight of ladle and molten metal is approximately 60 lb. Weight of metal in bogies conveying metal from cupola to moulders is quoted at 8 cwt. Each moulder handles on an average between 25-30 boxes a day (according to the particular type of work in hand).

The facing sands used is as follow:—Erith medium, Erith mild, with some Bromsgrove and about 5 per cent. coal dust. Approximately 14 moulders are employed and the average weekly output is at present 16 tons good castings.

Plating Shop

The plating shop has recently been reorganized and re-installed in a new shop, and forms an up-to-date example of electro-plating methods. The main function of the shop is divided into three sections:—Pre-treatment, nickel plating, chromium plating.

Pre-treatment

Components first pass through the trichloroethylene degreasing tank. This is followed by dipping in a series of electrolytic cleaners and hydrochloric acid tanks, alternating with water rinses, one to two min. being spent in each tank. This process ensures that the components are mechanically and chemically clean.

Plating

Here the components are placed in nickel vats for approximately one hr. at 98 deg. F. A current of 360 amps. is introduced into the solution by means of nickel anodes, and passes out *via* the component. This causes the nickel of the anode to flow through the solution and form a deposit on the component. The solution is agitated by means

*The G. and M. Group represents Glover and Main Limited, Thomas Glover and Company, Limited, R. & A. Main Limited, Main Water Heaters Limited, Main Enamel Manufacturing Company, Limited, and Morley Products (Padiham) Limited.

Pioneers in Gas Appliances

of compressed air, this aids even deposition, and is kept clean by filters.

After nickel plating, the components are immersed in the chromium tank for five to 10 min. In this process the current is introduced into the solution by lead anodes, the actual chromium being extracted from the chromium salts in the solution. The glass bottles floating on the solution are to damp down the toxic fumes generated by the process. (All plating-shop operators are medically examined every two weeks.) The following tank removes the excess solution, and the components then pass through a neutralizer and hot water rinse. Additional processes to be seen in the shop are—zinc-barrel plating, which can plate upwards of 60 gross of screws in 35 min., the "lacron" barrel polisher, which removes rough edges and burrs from components by means of pebbles and compound placed in a revolving drum for approximately 1½-2 hr. The average weekly output of the shop is 11,000 components.

Drilling Shop

All burners and parts are jigged and drilled assuring accuracy so essential to the assembly of mass produced cookers, etc. The chief points of interest are the automatic machines and multiple drilling machines. In the majority of cases these machines when working need little explanation. Of the labour employed in this shop, approximately 60 per cent. is female. Upwards of 100 machines are employed.

Paint Shop

The paint shop is a completely new plant which has been built and installed by Controlled Heat & Air, Limited, for the purpose of painting refrigerators. The pre-treatment plant on the right of the shop entrance, with its various tanks, ensures that all components are free from oil and rust, and in addition forms on the steel surface a phosphate coating of crystalline structure which is integrated with the parent metal. This acts as a bond and enhances the adhesion of the paint to the steel. The overhead conveyor which takes components on to the next stage has 90 stations at intervals of 4 ft. and travels at 1.1 ft. per min. The plant has been designed to produce some 500 sets of refrigerator components per week. Extraction and filtering plant ensure that the atmosphere in the shop is kept free from dust particles.

Fitting Shop

All appliances are assembled, tested and wrapped in the fitting shop. The two cooker assembly lines have capacity for 1,000 cookers each per week, whilst the refrigerator line is capable when fully manned of some 500 refrigerators of the No. 36 type per week. A rigid inspection system on each line ensures that each appliance is carefully scrutinized for defects before passing to the despatch department. Reject appliances are repaired adjacent to each assembly line.

Enamel Shop

As pioneers in the production of enamelled cookers, both cast and sheet iron, R. & A. Main, Limited, take a special interest in all matters pertaining to enamels and enamel frit, the basic ingredient of all vitreous enamels. Although the company has manufactured high quality vitreous enamels for their own use for over 50 years, it was not until the formation of the Main Enamel Manufacturing Company, Limited, that "Memcol" frit was made available to the trade in general. The latter company was formed in October, 1946, by Glover & Main, Limited, in conjunction with Dr. B. K. Niklewski; Gothic Works, Edmonton, being chosen as the site of the new Main Enamel factory in order that experiment and development could be carried out in close collaboration with an actual frit user.

The plant in the enamelling department (57,000 sq. ft.) includes the following:—

(1) A continuous-conveyor drier which deals with 2,000 sq. ft. of sheet iron or 25 to 30 cwt. of cast iron per hr. This type of drier can be individually heated or operated by waste heat from a muffle through a heat-exchanger unit. At the attendant spray-booths components are sprayed before being put on to the conveyor for drying.

(2) Four 15-ft. Dresler-type box muffles which are used for both metal and cast iron. For sheet metal the temperature is 760-835 deg. C. Firing time is 6½ min. and an average of 350-400 sq. ft. per hr. can be procured. For cast iron the temperature is at around 720-835 deg. C. Firing time is 20-30 min.; an average of 550 lb. per hr. can be dealt with. Fuel-oil consumption is given at eight and a half gallons per hr.

(3) A Ferro junior continuous furnace made by Ferro Enamels, Limited. This is mainly used for cast and sheet iron. Sixty-six hangers are used and five to 10 articles can be loaded on each hanger. Fired at a chain speed of 7 ft. 8 in. per min. the furnace has an output of 1,800-2,000 sq. ft. per hr. It is oil fired and has a 28 gall. per hr. consumption. This furnace has its attendant cast iron drier and spray booths.

(4) Incandescent furnace—this is similar to the two Ferro furnaces, but is of slightly larger capacity. There are 78 hangers. Chain speed is 9 ft. per min. and five to 10 articles can be loaded on each hanger. The length of chain in firing zone is 37 ft. and the average firing time for each part is 4 min. The furnace's capacity is 2,100-2,300 sq. ft. sheet metal per hr. and oil consumption is registered at 28 gall. per hr.

Egypt's New Steel Plant

President Nasser recently inaugurated a steel plant at Helwan, about 20 miles from Cairo. The plant was built with the help of West Germany. He hailed the establishment of an Egyptian steel industry as "the realization of a long-cherished dream," and said it would not only serve Egypt and Syria but the entire Arab world.

The steelworks, which has a capacity of 235,000 tons a year, has two blast furnaces and is scheduled to produce blooms, billets, sheet, bars, plate, and rails.

Book Reviews

ASME Handbook: Metals Engineering Processes. Sponsored by the American Society of Mechanical Engineers and published by McGraw-Hill Publishing Company, Limited, 95, Farringdon Street, London, E.C.4; price £5 4s. 6d.

This handbook is divided into nine parts each dealing with certain main aspects of metal processing, *viz.*, heat-treatment of steel, casting, hot-working, cold-working, powder metallurgy, welding and cutting, machining, finishing, and electroforming

Within each of these parts are sections dealing in detail with specialized topics. Thus, for example, within part two entitled "Casting" there are sections concerned with sand casting, centrifugal casting, gravity-die-casting of aluminium, die-casting of grey iron, pressure-die-casting, die-casting of zinc alloys, plaster-mould casting, and investment casting. A similar pattern exists in the other parts.

By and large, the text is a model of concise statement, and for certain purposes the information given may be regarded as insufficient. For example, the whole of part two dealing with "Casting" is contained within the compass of 33 pages. Nevertheless, this publication is a handbook rather than a textbook, and as such it can play an important part in providing a collection of concise data dealing with all aspects of the various processes by which metals are converted into finished products. In general, the metals and alloys referred to are quoted in terms of American specifications.

One of the features of this book is the provision of data concerning the suitability of various metals and alloys for each process. The work is fully illustrated, in addition to which there are numerous charts and tables. The handbook can be recommended to foundrymen, engineers and designers as a useful desk reference-book dealing with the processes of metals engineering.

Metallurgy of Vanadium. By William Rostoker. Published by Chapman & Hall, 37, Essex Street, London, W.C.2; price 68s. net.

This book, as the author states, is an authoritative and well-referenced record of knowledge of vanadium at the present moment, and in no way does it try to suggest that the record is complete, particularly in respect of its physical and mechanical properties and of the alloys which could possibly be made with this metal. It appears to be the only text book on the metallurgy of vanadium and should be invaluable to those who wish to make a comprehensive examination of its properties.

Although up-to-date figures are not available, it does appear that production of vanadium as oxide has reached a very high figure in the USA as one of the important by-products in the extraction of uranium from carnotite ore. The extraction of the pure metal from the oxide is described in detail and shows a marked resemblance to the processes used for the extraction of titanium by the reduction of vanadium iodide and vanadium chlorides.

Chapters are devoted to the physical and mechanical properties of vanadium insofar as they are known, although some care should be taken when considering the values reported, particularly with respect to physical properties, since many of them were measured when vanadium was more impure than is presently the case and in many cases the influence of impurities is not known. The mechanical properties are profoundly affected by small quantities of hydrogen, carbon, oxygen and nitrogen, and hardness measurement can be a useful guide as to the degree of purity.

A large number of elements form solid solutions with vanadium by virtue of the close similarity of their atomic radii. Details of many binary and some ternary systems, together with phase diagrams where sufficient information is available, are given.

So far as the mechanical properties of vanadium alloys are concerned, these can be varied over a very wide range, but not to such a degree that they are outstanding by comparison with other metals. However, in fairness to the author, it should be stated that alloy development is still in its early stages and much valuable information is available on the binary alloys of vanadium with aluminium, chromium, iron, molybdenum, nickel, silicon, titanium and zirconium, and ternary alloys such as V/Fe/Ti, V/Sc/Ti, V/Cr/Zr, V/Si/Zr, V/Cr/C and V/Al/C.

The hot tensile, stress rupture and creep properties given in this book suggest that alloys containing 5 to 20 per cent. titanium may be of value for purposes where moderately light high-hot strength, formable and weldable sheet is required.

The technology of vanadium has only been carried out on a laboratory scale, but it appears to present many of the problems applicable to titanium. Processes have been developed for melting, alloying, casting, forging, extrusion, rolling and drawing. Plating procedures are utilized to retard high-temperature oxidation. Although no information is available on the welding characteristics, it is thought that practices suitable for titanium are both applicable and mandatory.

The author has devoted two short chapters relating to the oxidation, corrosion and embrittlement of vanadium, which subjects are followed by a useful chapter of the metallography of vanadium and its alloys in which a number of microphotographs of the structures obtainable are illustrated. Finally, the use of vanadium as an alloying addition in steel, cast iron, titanium alloys, magnetic and high-temperature alloys is discussed.

J. RICKARD.

Proceedings of the International Conference on Fatigue of Metals, 1956. Published by the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1; price £4 10s., post free.

This volume records the proceedings of the conference sponsored by the Institution of Mechanical Engineers in co-operation with the American Society of Mechanical Engineers, and held in London and New York during September and November, 1956. The book contains an introductory address on "The Changing Nature of the Fatigue Problem," by H. J. Gough, followed by some 81 papers arranged under five headings, *viz.*:—(1) Stress Distribution; (2) Temperature, Frequency and Environment; (3) Metallurgical Aspects of Fatigue; (4) Basic Aspects of Fatigue; (5) Engineering and Industrial Significance of Fatigue—the last-named being dealt with under three subsidiary headings: (i) General Service, Automobiles, and Specific Components; (ii) Airframes and Engines, and (iii) Marine Engines, Railways, and Welding. Relative to each group of papers there is a Reporter's Introduction—both for the London and New York sessions—and at the end of the volume the general discussion recorded at the meetings. There are full name and subject indices.

This collective work of over 900 pages constitutes a most authoritative survey of the position in 1956, with regard to all aspects of the fatigue of metals, and it will take its place alongside earlier volumes which give the printed records of conferences on fatigue held in 1939, 1946, and 1950.

F

Book Reviews

Bearing in mind the great present-day interest in fatigue, the appearance of this volume is very welcome and particularly appropriate, and it will for many years constitute a standard reference text for all those concerned with the subject.

In particular, it is suggested that foundrymen and designers will profit greatly from a study of many of the papers, especially those dealing with the fundamental aspects of the subject. This work can be recommended without reserve.

Madman's Whisper (a detective story) by Richard Grayson. Published by Hammond, Hammond, 87, Gower Street, London, W.C.1; price 12/6.

It can reasonably be supposed that this book was sent to the JOURNAL, because the publishers, like 90 per cent. of the population, imagine that the foundry industry is synonymous with that of iron and steel. This interesting crime story has a rolling mill as a background, and the author is so knowledgeable on iron and steel manufacture that he at least would be able to differentiate. Whilst the suspects, including the detective, were a little unconvincing, yet the actual murderer was quite difficult to place until the denouement. The author has a keen sense of observation, uses some clever aphorisms, and has told a rattling good story a cut above the average in this field.

V.C.F.

Publications Received

Opportunities for Training with the Stanton Ironworks Company, Limited. Published by the company from P.O. Box No. 3, near Nottingham.

Mr. W. S. Matthews, the company's training officer, points out that this is a revised edition. It contains an excellent account, with illustrations, of the firm's activities, and without going into too much detail, outlines the courses provided for craft, technical, student, commercial, and graduate apprentices: a sixth group covers secretarial and clerical training. This type of education produces excellent results, as it combines the old-fashioned apprenticeship with technical-school tuition, but is devoid of evening study as part-time release is in vogue. The scheme outlined embraces all types, ranging from the trade-school student to the university graduate, and an appendix details the remuneration offered.

Safety. Published quarterly by the British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1.

The opening paragraph states that copies are available for everyone in the iron and steel industry concerned with accident prevention, *i.e.* managers, foremen and safety committee members as well as accident prevention officers. It can be assumed that many branches of iron and steel founding fall into this classification.

This 48-page magazine, well illustrated in colour, is of wide interest as the most prevalent accidents are common to all industries. Serious study is given to poster publicity with emphasis being given to frequent change of design. An important article on "Guard Your Home," illustrates a number of safety gadgets which makers of domestic-heating equipment, would do well to study. This is a really interesting and practical contribution to the safety-first campaign.

Stepping Out with Progress. Morgan Crucible Company, Limited, Battersea Church Road, London, S.W.11.

This company have used a triple-leafed folder to epitomize their history and present structure. It is not easy to cover a 100 years of history and the present world-wide organization in so few pages, yet the compression has been entirely successful and satisfactory.

House Organs

Nickel Bulletin, May, 1958. Issued by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

This issue contains useful information on electrodeposition of nickel. Also a number of intelligently extracted articles covering materials into which nickel enters as a major component. The *Bulletin* for June contains abstracts of papers presented at the recent annual conference of the Institute of Metal Finishing. Subjects of the 11 papers presented, range from a study of stress in nickel deposits to determination of their weather resistance, and variation in properties resulting from ageing of bright-nickel solutions. A new process for electrorefining nickel, developed by the International Nickel Company of Canada, is also dealt with.

Victor Magazine, Vol. 5, No. 5. Published by Victor Products (Wallsend), Limited, Wallsend-on-Tyne.

Reported in this issue is the award of the O.B.E. to Mr. R. W. Mann, the managing director; there is also an account of the annual conference of the National Association of Colliery Managers at Whitley Bay, when the Victor company were hosts at a luncheon party and also received the delegates for a visit to their works. One picture included in this issue shows the visitors in the shell-moulding department. This magazine is intended solely for the interest of the employees and the reviewer considers that its Editor caters for them remarkably well.

Platinum Metals Review, Vol. 2, No. 5. Issued by Johnson, Matthey & Company, Limited, Hatton Garden, London, E.C.1.

A most interesting article on "Pyrometry in the Non-ferrous Foundry," which contrasts the high degree of instrumentation in the steel industry as compared with the scarcity of pyrometers in the brass and bronze foundries, appears in this issue.

"Sif-Tips," No. 102. Issued by the Suffolk Iron Foundry (1920), Limited, Stowmarket.

The contents of this issue include an article on the wide use of Sifbronze by the London Transport Executive, an article on automatic brazing, and a reminder of the importance of safety in the welding shop.

Fanfare, No. 96; issued by Woods of Colchester, Limited, Braiswick Works, Colchester.

This issue contains an interesting article on pneumatic sand conveying, which describes and illustrates a plant installed at the Farrington Foundries of Leyland Motors, Limited.

THE QUALCAST GROUP, of Derby, ironfounders, has restored to their 3,000 employees a voluntary holiday bonus of a full week's average pay. Last year, because of a recession in earnings, it was reduced to four-fifths of an average week's pay.

Flame Washing . . .

. . . for the Foundry*

Before the introduction of the powder-washing process to steel foundries, the removal of burnt-on sand, sand cores and heavy riser pads from steel castings was a major problem in many foundries and was dealt with mainly by the slow, laborious methods of pneumatic chipping, swing grinding, etc. To-day, the powder-washing and powder-lancing techniques have (for sand removal in particular) replaced these older methods and have helped considerably to cut costs and speed up production.

Powder washing is an economical proposition where heavy sand and metal are encountered because it is considerably faster than pneumatic chipping. However, when it is a question of light metal removal, the difference in speed is narrowed down. Therefore, in the medium and light range of steel castings, pneumatic chipping and grinding are still the methods mainly employed for the removal of excess metal such as flashing, core-joint offsets, riser pads and chill nails.

Flame washing has now been developed to meet the need for a cheaper and better method than those of chipping and swing grinding for removing excess metal. For the go-ahead foundry, the process offers the following advantages:—(1) Equipment costs are very low; (2) it can reduce fettling time and costs considerably, depending on the type of casting; (3) flame washing is a much more attractive job than chipping or grinding and an operator can be trained quickly, and (4) everyone in the vicinity benefits by the reduction in noise and dangerous dust caused by chipping and grinding. The equipment is quite simple—much the same as for normal cutting operations except that a special curved nozzle is fitted (as is shown in Fig. 1) and propane is used as the fuel gas. An angle-headed cutter is used, such as the Saffire or the Cutogen No. 5 (24 in. by 75 deg.), with its injector modified.

Method Used

An operator skilled in oxy-acetylene cutting can become proficient at flame washing with about a week's training. To commence, the nozzle is held at approximately 30 deg. angle to the surface being washed. The blowpipe is then moved, with the preheat flame only, over an area about 2 to 3 in. wide to raise the surface metal to ignition temperature. The washing oxygen is then turned on slowly and gradually increased as the pool of molten metal increases; the blowpipe being moved forward with a side-to-side weave covering a width of about 3 to 4 in. maximum at a time. Manipulation of the blowpipe is very important as the molten metal must be kept moving forward and the new surface formed blended into the metal line of the casting.

The area that can be flame washed in one pass depends on how quickly the surface can be heated to ignition temperature. On removing riser pads larger than 3 to 4 in. across, two or more parallel passes may be necessary. Also pad surfaces which are too thick should not be attempted in one pass, as the large pool of molten metal formed would be very difficult to control. Only surfaces up to ½-in. in height should be tackled at one time. It helps to position the casting at an angle which allows the slag to run ahead slightly of the reaction zone. This makes the pool of metal more manageable and also assists by preheating in advance.

Gas pressures recommended for flame washing are in the region of 15 lb. per sq. in. for propane and 70 to 100 lb. per sq. in. for oxygen, depending on the size of casting and the thickness of section being processed. Gas consumptions vary accordingly but for most operations are between 40 to 60 cub. ft. per hr. propane and 400 to 600 cub. ft. per hr. for oxygen. The washing oxygen must be of sufficient velocity to remove the excess metal without gouging below the metal line of the casting. After setting the pre-heat flame to its maximum without jumping the nozzle, the operator then depresses the oxygen lever to obtain the correct flow of washing oxygen for the job in hand. A good operator will be continually varying the

FIG. 1.—*Close-up of flame-washing operation. The blowpipe in use is the 27-in. Saffire Universal with 75 deg. angle head.*

* Reproduced by permission from the Editor of "Torch."

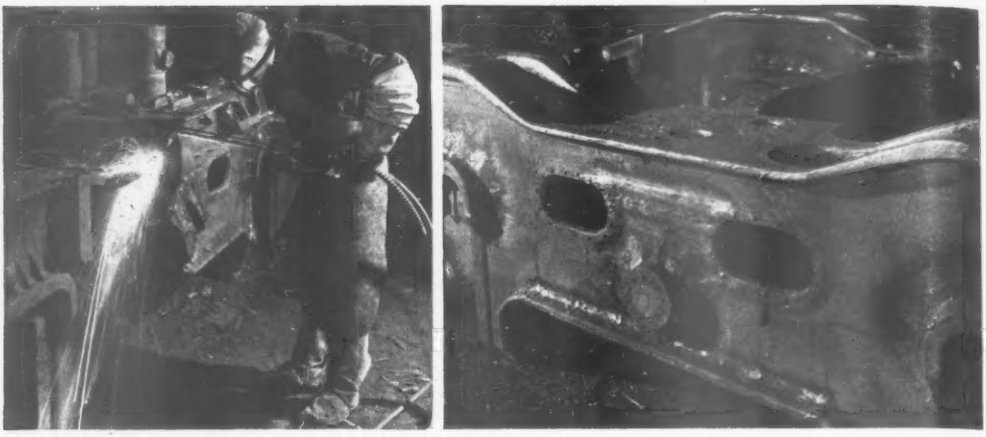


FIG. 2.—(*left*) *Flame washing a cast steel one-piece bogie frame with the Cutogen 5 at English Steel Castings Corporation, Limited, Sheffield, and* (*right*) *the same casting after treatment.*

oxygen lever pressure according to the height and width of the metal to be removed, surface heat available and finish required, to obtain the highest speeds.

Applications

Flame washing can be used on all shapes and sizes of castings normally dealt with by chipping and grinding. Also, the blowpipe can reach areas not readily accessible by hand grinders. It can be used to remove flashing, riser pads, brackets, chill nails and to blend in core offsets. Two or more passes may be necessary when dealing with the heavier sections although, if flame washing can be applied directly after risers and gates have been removed, the heat derived from oxygen cutting will assist the washing operation.

The process is limited, as a general rule, to castings that can be cut readily and safely by normal oxygen-cutting methods. When flame washing the lighter sections of a casting, care must be taken to prevent overheating in order to avoid distortion. With regard to high-carbon content castings, precautions normally adopted when heating locally (when cutting and welding for example) would have to be taken to avoid cracking and hardening. Flame washing is not effective when sand is encountered to any extent or when dealing with stainless and high-alloy steels. This is where powder washing takes over.

Although developed primarily for use in steel-foundries, flame washing can be adapted to other types of work. For instance, the process is already being used in the manufacture of crane hooks. In this case, the approximate shape required is profile cut from thick steelplate and then flame washing is employed to shape the hook from the square section. Previous methods employed were grinding and hammering to shape the cut section.

Russia's "Economic War"

What the Western world had to fear from the Soviet Union was an economic war—and it had started already, said Mr. Norman Brooke, joint managing director of Guest, Keen & Nettlefolds (South Wales), Limited, at Cardiff on Monday. Mr. Brooke, who had just returned from a steel mission to Russia, said that the steelmaking plant he saw in the USSR was extremely efficient.

Russia was following a policy of keeping prices high at home so that they could be cut for export, although the goods the Russian Government wanted the people to have were kept cheap. He remarked too on the output of technical graduates from Moscow University —the "simply fantastic" figure of 6,000 a year.

LEYLAND BELGIUM S.A., agents for Leyland Motors, Limited, in Belgium, have changed their address and are now situated at 18, Avenue de Saio, Anderlecht, Brussels.

Metal Industries Contemplates Expansion

Entry into fields allied or complementary to those in which Metal Industries, Limited, is at present engaged, was announced by the chairman, Sir Charles Westlake, at the company's annual meeting. The board, he said, was negotiating for the acquisition of two businesses; it was inadvisable to indicate the names or detail activities at present, but a full announcement would be made at "the appropriate time." Despite more difficult trading conditions, gross profit for the first 12 weeks of the year was close to that of the corresponding period of 1957. An interim profit statement would be published in a few months' time.

GENERAL ELECTRIC COMPANY, LIMITED—Sir Harry Railing, who resigned from the chairmanship on October 31, 1957, retires from the board by rotation, but is not seeking re-election.

News in Brief

A TANKER of 18,000 tons d.w., ordered from Hawthorn Leslie (Shipbuilders), Limited. Hebburn-on-Tyne, by Shell interests, has been transferred to the Hadley Shipping Company, London.

AVERAGE SELLING PRICES for the four weeks ended July 11 (calculated to the nearest 10s.) of members of the Association of Light Alloy Refiners and Smelters were:—LM1, £145 10s. per ton; LM2, £155 10s.; LM4, £173 10s.; LM6, £190.

A PRODUCT BY A FALKIRK FIRM is illustrated in the annual report of the Council of Industrial Design. The product, a Queen heater, designed by Mr. David Mellor for the Grahamston Iron Company, Limited, was chosen for display at the Brussels International Fair.

A NEW training and educational centre built by Babcock & Wilcox, Limited, at its main works in Renfrew currently serves 760 apprentices. It has a technical library and a well equipped lecture room with seating accommodation for 200. There are modern training workshops nearby.

THE COMMENCEMENT OF MINING at Mindale Hill, Nyasaland, of a high-grade iron ore, is reported by the Blantyre office of Barclays Bank D.C.O. It is stated that a trial order is being shipped to Europe for further testing. Initial analyses of the ore have shown an iron content of 68 per cent.

MOND NICKEL COMPANY, LIMITED, has announced a reduction of £20 in their price for oxide sinter per ton of nickel content. This brings the price to £550 delivered UK works. The reduction is in line with the announcement made on July 23 by the International Nickel Company of Canada, Limited.

IMPROVED SICKNESS and pension rates for employees have been announced by Head, Wrightson & Company, Limited, the Thornaby-on-Tees engineers, etc. In addition, men paid off as redundant will be given one month's notice instead of a week. The extra costs of the higher benefits are being borne by the company.

WITH EFFECT from August 18, the import licensing restrictions will be removed from a wide range of chemicals and allied products imported from the dollar area. With certain exceptions, such as dyestuffs and intermediates, import licences will no longer be required for most chemicals used as industrial materials.

W. E. BRAY & COMPANY, LIMITED, Feltham (Middx), has changed its name to Bray Construction Equipment, Limited. The change has been made so that the title may be more closely allied with the company's main products. The company is a member of the Sheepbridge Engineering group and produces earth-moving machinery.

UNITED STEEL COMPANIES, LIMITED, Sheffield, have been using a twin-engined aircraft to speed up communications between their branches in South Yorkshire, Lincolnshire and the North West. A landing strip at Netherthorpe, near Spinkhill, is used for flights in the Sheffield area, and for Scunthorpe, Hemswell RAF base is used.

THE SHEFFIELD FIRM of Firth-Vickers Stainless Steels, Limited, has won one of two diplomas for a casting by the lost wax process, submitted at the annual conference in Paris of the European Investment Casters' Association. To win the award the casting needed to show "the greatest promise for widening the scope of the investment casting technique."

DOMINICAN IMPORTS of iron and steel are increasing rapidly states an "Exporter's Guide to the Dominican Republic," prepared specially for British exporters by the republic's embassy in London. They have risen in value, from $6,500,000 in 1955 to $8,000,000 in 1956, and $15,200,000 last year. An invitation is also extended for personal visits from British businessmen.

TRIPLEX FOUNDRY, LIMITED, is to acquire the Churchfield Spring Company, Limited, West Bromwich, for a consideration of £82,500, the approximate book value of the net tangible assets, announced Mr. W. H. L. Harrison, chairman of Triplex, at the annual general meeting on Wednesday. Churchfield's premises adjoin those of Vowles Aluminium, Limited, acquired by Triplex in 1957.

SUNDERLAND SCIENTIFIC GLASSWARE manufacturers, James A. Jobling & Company, Limited, recently payed off 281 employees out of its total force of 2,800. Seventy per cent. of the redundant workers are men. Mr. J. A. Cochrane, deputy chairman, said that wage awards and rising costs had taken profits out of the business. The company had decided to cut expenses and eliminate all overtime.

MILLSPAUGH, LIMITED, Sheffield, are completing a 90-ft. long feed splitter tower for the Cork refinery of Esso Petroleum Company. It weighs 25 tons and is 6 ft. 6 in. dia. Bogies with wheels over 5-ft. high have been made to fit on either end for transport of the tower to Liverpool, when it will be towed across the Irish Sea. It will be pressurized for the journey. It is one of five such steel towers being made for the company by Millspaugh.

THE BOARD OF TRADE announce that they are prepared to consider applications for licences to export to all destinations, other than to ports or countries in the Sino/Soviet Bloc, limited quantities of iron or steel scrap and old metal. Applications stating grade, f.o.b. price, and whether the applicant is in possession of a firm order for the material, should be made to the Export Licensing Branch, Board of Trade, 2/14, Bunhill Row, London, E.C.1, on Form (F).

THE NEW LABORATORY, now being built at Stevenage (Herts) for the Department of Scientific and Industrial Research, is to be called the Warren Spring Laboratory, after a lane that used to run across the site of the new building. Work will be carried out at Warren Spring on air pollution, the synthesis of oil and chemicals from carbon monoxide and hydrogen, mineral processing, and any other important subject which cannot be fitted into the programme of another research body.

A DEMONSTRATION was recently staged of the British Straddle Carrier Mk.2, the first vehicle of its type designed to comply with the "Construction and Use" Regulations of the Ministry of Transport, which permits its use on public roads. The demonstration was in two stages. The first was held by co-operation of Burt, Boulton & Haywood, timber importers, at their yard at Burt's Wharf, Belvedere. The second stage followed after luncheon at the airfield of Short Bros. & Harland, Limited, at Rochester.

STUDENTS FROM INDIA attended a special one-week residential course from July 21-26, at Ashorne Hill, Leamington, the staff college of the British Iron and Steel Federation. The course was part of a scheme by which British steel and engineering firms are assisting India to expand its steel industry. Among companies taking part in the scheme are the Round Oak Steel Works, Limited, Brierley Hill, Staffs; Stewarts and Lloyds, Limited, Bilston; Wellman Smith Owen Engineering Corporation, Limited, Darlaston; English Electric Company, Limited, Stafford; British Thomson-Houston Company, Limited, Rugby, and the G.E.C. Company, Limited, Witton, Birmingham.

News in Brief

J. BROCKHOUSE & COMPANY, LIMITED, in conjunction with W. G. Allen & Sons (Tipton), Limited, announce that they are forming a joint company to be known as Brockhouse Allen, Limited, in the Federation of Rhodesia and Nyasaland. It will operate from factories acquired from J. Brockhouse (Rhodesia), Limited, in Ndola and Luanshya, and will produce engineering requirements for the mining and transport industries. W. G. Allen & Sons (Tipton), Limited, already have an established connection with the copper mines. The new company will be capitalized at £200,000, of which J. Brockhouse & Company, Limited, will hold 60 per cent. and W. G. Allen & Sons (Tipton), Limited, will hold 40 per cent. J. Brockhouse (Rhodesia), Limited, will continue to act as a separate entity in Southern Rhodesia.

THE EXPORT CREDITS GUARANTEE DEPARTMENT announces that cover for business with Colombia is once more available. Cover for all new business was suspended from August 1, 1957 " in view of substantial exchange delays and of the unsettled outlook still persisting." Although Colombia's payments position is still difficult, there has been some improvement recently, and ECGD considers that a basis for cover once more exists. Where business involving a credit period between 6 months and three years is covered under an endorsement providing ECGD with a spread of such business, normal cover for 85-90-95 per cent. of loss will be available. For such business underwritten specifically, and for all medium term (up to a maximum of 5 years credit) business, ECGD liability will for the present be limited to 75 per cent. of loss.

A PARTY OF RUSSIANS led by Mr. V. I. Baranov, deputy director of the Department of Turbine and Boiler Construction and a State Planning Committee member, visited the works of John Thompson, Limited, at Ettingshall, Wolverhampton, on July 24. They saw work in progress for the fabrication of sections for the heat exchangers which form part of the Berkeley nuclear-power station which the company is helping to build. The visitors were received by Mr. J. H. N. Thompson, joint managing director. The 14-day tour of Britain by the Russian party is the outcome of a request from the Russian trade delegation, resident in London, and was organized by the British Water Tube Boilermakers Association of which Sir Edward Thompson, chairman of John Thompson, Limited, is a past-chairman. Later the British Association is to send a reciprocal mission to Russia.

EFFORTS BY THE INDUSTRIAL ASSOCIATION OF WALES and Monmouthshire to obtain the support of the Birmingham Chamber of Commerce in plans to increase the share of the South Wales ports in Midland export traffic was referred to on July 21, in a report to the Council of the Chamber from its Transport Committee. The Association had sought to secure the backing of the Chamber in its attempts to remove the anomaly of additional charges to f.o.b. suppliers which apply to the South Wales ports, but the Transport Committee reported that in its opinion joint action on the lines suggested by the Association would not be of advantage to Midland exporters at present. The report added that higher freight charges also applied to South Wales transits and pointed out that vessels calling at the ports in the group often call afterwards at other ports where later delivery dates could be given. It will be recalled that Newport held a special exhibition in Birmingham earlier this year and this month (July) invited a party of Midland members of the National Union of Manufacturers to inspect facilities at its port, in an attempt to attract more traffic there.

H.C. Hopper/Barnards Foundry Merger

H. C. Hopper (Kingston) Limited, Hampden Road, Kingston-upon-Thames, Surrey, announce that as and from June 30, the above company have merged with Barnards Foundry Limited, Norfolk Ironworks, Coslany Street, Colegate, Norwich, and it intends eventually, to join the iron and non-ferrous foundries of both firms into one large foundry at Norwich, this to be known as Barnards Foundry Limited. The wood and metal patternshop, and machine shop, will trade as H. C. Hopper (Kingston) Limited. The move will enable the firm to enlarge the foundry space considerably, and whereas in the past it has only been able to produce castings of up to 2-tons, the range will be extended to 8-tons. It is also intended to enlarge the capacities of both the wood and metal patternshops, and machine shop, and at the same time carry out a plan of modernization.

Apart from the two business addresses, *i.e.*, Barnards Foundry Limited, and H. C. Hopper (Kingston) Limited, the London office address for both companies is—175 Regent Street, London, S.W.1 Telephone No. REGent 7625.

Mr. R. Scott, who is well-known in foundry circles, will become managing director of both Barnards Foundry Limited, and H. C. Hopper (Kingston) Limited. Mr. Scott is president of the National Society of Master Patternmakers; that organization's representative on the City & Guilds Advisory Committee for patternmaking and foundry practice; and a Council member of the South of England Ironfounders' Association.

Scrap-control Price to End

Control of price and distribution of iron and steel scrap will be ended on November 1. Exports of scrap will continue to be controlled, but some may be sent abroad in limited quantities. The big change is being made, say the Government, because supplies of scrap are now so much improved that imports are no longer necessary.

Sir Ian Horobin, Parliamentary Secretary to the Ministry of Power, said: "The Government has decided that the public interest no longer requires it to use its powers under the Defence (General) Regulations, 1939, to control the price and distribution of iron and steel scrap in the UK. The Iron and Steel Scrap Order will accordingly be revoked with effect from November 1, 1958. Control over the export of iron and steel scrap will continue, but Lord Mills is considering with Sir David Eccles, President of the Board of Trade, the possibility of allowing the export of some limited quantities."

It is 19 years since iron and steel scrap was first brought under control—as soon as war broke out in September, 1939. Persistent shortage of scrap has forced the continuance of the control ever since the end of the war.

Recent Wills

SPERRYN, W. J. G., a director of Sperryn & Company, brassfounders and finishers, etc., of Birmingham	£97,130
SHAW, W. G., former chairman of William Shaw & Company, Limited, steelfounders, of Middlesbrough	£52,251
BIRD, C. K., formerly manager of turbine contracts of the British Thomson-Houston Company, Limited, Rugby	£5,672
HORSFORD, F. C., formerly manager of the Birmingham branch of W. T. Henley's Telegraph Works Company, Limited	£6,907

Personal

Mr. N. J. TRAVIS has been appointed to the board of Borax (Holdings), Limited.

Mr. J. WINTER has been appointed managing director of Spermolin, Limited, foundry suppliers, Halifax.

Mr. A. L. C. LINDLEY, a managing director of the General Electric Company, Limited, has joined the board of directors of the Motherwell Bridge & Engineering Company, Limited.

Mr. E. G. BOISSIER, deputy chairman of Aiton & Company, Limited, pipe engineers, of Derby, sailed for a visit to Australia and New Zealand on August 6, and will return in December.

British Railways announce that Mr. H. BOOTH has been appointed staff assistant to the chief mechanical and electrical engineer, Eastern Region of British Railways, Doncaster. He fills the vacancy created by the retirement of Mr. W. R. SMITH.

Mr. P. T. ENSOR, formerly general manager of the Canadian British Aluminium Company, Limited, has returned to the UK and has been appointed assistant to Mr. G. W. Lacey, commercial director of the British Aluminium Company, Limited.

The late Mr. FREDERICK CHARLES, a retired pattern-maker, of Garforth, near Leeds, who left estate valued at £1,007 gross, bequeathed to the Curator of the Castle Museum, York, "such of any models as he shall choose to have for the benefit of that museum."

Mr. R. W. DRAPER, excavator sales manager of Priestman Bros., Limited, has been appointed London manager for all products from October 1. Mr. NORMAN H. JOSEPHY, London manager, has been appointed general sales manager resident in Hull from that date.

Mr. STAFFORD BEER, head of the department of operational research and cybernetics of the United Steel Companies, Limited, is to lecture at the second international congress on cybernetics at Namur, Belgium, in September. He will read a paper on "The Irrelevance of Automation." Mr. Beer will be accompanied by Dr. K. D. Tocher, his department's research manager.

The Postmaster-General has appointed Mr. O. W. HUMPHREYS, a director of the General Electric Company, Limited, and president of the Institute of Physics, as chairman of the advisory committee on wireless interference from ignition apparatus, in succession to Sir STANLEY ANGWIN, who has resigned because of ill health. Mr. W. NETHERCOT has been appointed a member of the committee.

Mr. O. W. REYNOLDS, has been appointed education and training officer of Richard Thomas & Baldwins, Redbourn Scunthorpe works, from September 1. At present he is area training officer of the British Iron and Steel Federation, West Riding and North Derbyshire, training committee. Before joining the Federation, Mr. Reynolds was assistant education officer, at Appleby-Frodingham Steel Company, Limited, Scunthorpe.

Mr. A. G. HEWITT, for many years blast-furnace superintendent of the Indian Iron & Steel Company, Limited, West Bengal, and from 1955 blast-furnace consultant to Head, Wrightson & Company, Limited, Stockton-on-Tees, and adviser and consultant in blast-furnace operation to the Empresa Nacional Siderurgica, S.A. Aviles, Spain, has been appointed general manager of the Cambata Ferro-Manganese, Limited, Bombay.

Mr. T. S. LING and Mr. A. C. BUREAU have been appointed to the boards of Ernest Scott & Company, Limited, and George Scott & Son (London), Limited, members of the Henry Balfour & Company, Limited, group, gas and chemical engineers, etc., of Leven (Fifeshire). Mr. Bureau is a director and general manager of Balfour Lecocq, Limited, and gas consultant to Henry Balfour & Company. Mr. Ling is in charge of the Rietz division of George Scott & Son (London).

After 31 years at the Round Oak Steel Works, Brierley Hill, Mr. G. R. BASHFORTH, the firm's chief technical liaison officer, is retiring at the end of September. Mr. Bashforth who joined the company in 1927 as assistant melting shop manager, became manager of the shop in 1938, and took over his present position in 1955. He has been a well-known figure among Midland steel men serving as president of the Staffordshire Iron and Steel Institute from 1939 to 1942. He has for many years been a visiting lecturer to the Birmingham College of Technology.

At a meeting of the board of F. H. Lloyd & Company, Limited, held on July 24, the following senior members of the organization were appointed directors: Mr. W. R. COOPER, assistant managing director of Lloyds (Burton) Limited; Mr. W. H. NICKLIN, sales manager; Mr. F. CLYMER, A.M.I.MECH.E., A.M.I.PROD.E., foundry manager, and Mr. W. L. Beasley, production manager. At a meeting of the board of Lloyds (Burton), Limited, held on the previous day, the following senior members of the organization had been appointed directors of that company: Mr. M. C. LLOYD, M.B.E., assistant managing director of F. H. Lloyd & Company, Limited, and Mr. F. Clymer.

Obituary

Mr. CORNELIUS BINKS, a director of C. Binks, Limited, non-ferrous founders, of Limehouse (and with premises in Stratford and Manor Park), London, has died.

Lt.-Col. STEWART MARMADUKE CAIRNS, managing director of Robt. Boby, Limited, manufacturing engineers and foundrymen, of Bury St. Edmunds (Suffolk), a subsidiary of Vickers-Armstrongs, Limited, has died at the age of 66.

Mr FREDERICK MARK BARFOOT, who helped to form the efficiency department at the works of Rolls-Royce Limited, Derby, and was head of the department until he retired in 1947, after more than 30 years' service, has died aged 77.

The death is announced of Mr. JAMES HARLEY, who had a long and distinguished career in the ironfounding industry. On his retirement as works manager in 1952, he had spent 50 years in the service of Broomside Foundry Company (1922), Limited, Bonnybridge.

Mr. JOHN B. MACKIE, formerly outside manager of the Greenock firm of John G. Kincaid & Company, Limited, marine engineers and boilermakers, has died at the age of 71. He started working for the company in 1924, and remained with it until he retired seven years ago.

The death occurred on Thursday, July 24, of Mr. ERNEST PARRY, personnel and welfare officer of Tweedales & Smalley, Limited, textile machinery manufacturers, etc., of Castleton (Lancs). He had been with the firm for over 50 years, and was due to retire in October. Mr. Parry was 64.

Company Meeting

The Wolverhampton Metal Company

GROUP WELL-EQUIPPED TO MEET EVENTUALITIES

Mr. Thomas C. James on Company's High Reputation

The 55th annual general meeting of The Wolverhampton Metal Company, Limited, was held on August 1 in Birmingham, Mr. Thomas C. James (Chairman and Managing Director) presiding.

The following is an extract from his circulated statement:—

The Group Profits, at £507,119 before taxation, fell below the peak figures of the previous year. In my Statement last year I referred to the less favourable conditions in our industry. Notwithstanding the narrower margins and difficult supply position, our profit for this awkward year has been helped by the following:—(1) Improvements in general efficiency and economy have been effected. (2) A programme of reduction of expenditure resulting in a substantial fall in operating costs. (3) Processing techniques have been improved. (4) You will recall my reference last year to our increasing ability, as a result of research and new plant, to process waste products still more economically.

Having regard to the conditions of trade generally, production and sales have been satisfactory with contributions to Group Profits from our main subsidiaries and branches.

Consolidated Profit And Loss Account: After providing £71,438 for Depreciation our Group Profit is £507,119 and the balance of Group Profits available for distribution is £234,229 as compared with £298,782 last year. The Board has transferred to General Reserve £44,001, which raises the General Reserve to £400,000.

Future Outlook: In considering the trading prospects for the immediate future, it must be assumed that, as there is now too much productive capacity in this country for business available, the existing keen competition both on buying and selling will continue and margins will tend to remain on the low side. We hope, however, to continue to mitigate the effect which these lower margins will have on profits by increasing efficiency and economy, thus enhancing our unique position in the trade.

We have already had substantial benefit from improvements in our production methods and recovery processes referred to previously. Constant research continues on further technical development and progress in this field is encouraging. To enable us to meet with confidence our future trading problems, some capital expenditure on additional modern plant and equipment, will, we feel, be beneficial.

As far as the very long-term future is concerned we also have to bear in mind that trading conditions could change with the development of the European Free Trade Area.

The reputation which we have built up as a result of the high quality of our alloys, copper cathode, and other products is and still will be a valuable help to us in facing competition from this country and elsewhere.

In common with other Copper Smelters, we are concerned at the efforts being made to increase exports of non-ferrous scraps and residues. The dangers which would arise from unrestricted export of the industry's raw materials could react very seriously on the whole of the Copper Smelting industry and non-ferrous ingot makers.

With our up-to-date plant, specialized knowledge, and adequate liquid assets, we are in an exceptionally strong position in all respects; and this, backed by our experience and resources generally, should mean that we can expect to secure a good share of the business which is available and be able to face the future with confidence. Taking everything into account, we hope to be able to continue to show satisfactory results, subject to no unforeseen circumstances arising.

The report was adopted and the total distribution of 27½ per cent., less tax, was approved.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

794,742. American Cast Iron Pipe Company, 2930 16th Street, Birmingham 3, Alabama, USA.

An improved method for centrifugally casting iron- and steel-pipe tubing, and similar hollow bodies, generally of cylindrical form. (See also Patent Nos. 717,515, and 717,568.)

795,306. Foundry Equipment, Limited, and A. S. Beech, both of Linslade Works, Leighton Buzzard, Beds.

Improvements in shell-moulding machines (see also B.P. 728,108). The machines are improved in that they are sufficiently flexible to be readily adapted to various sizes of patterns. The stripping assembly has also been improved, and better automatic control provided.

795,441/2/3. Polygram Casting Company, Limited, Power Road, Gunnersbury, London, W.4.

Improved apparatus for producing hollow cores for foundry use more quickly and accurately than has previously been possible.

795,471. Birmingham Small Arms Company, Small Heath, Birmingham, 11.

Hardenable "ferritic" or martensitic chromium-alloy steels (see also Patent Nos. 730,272 and 733,146). The basis of this new invention is the incorporation of specific proportions of aluminium in nitrogen-containing alloys.

795,593. A. B. Akers Styckebruk, Akers Styckebruk, Sweden.

Hot permanent moulds for use in centrifugal casting of tubular metallic bodies.

795,978. H. J. Daussan, 9 av Leclerc de Hauteclocque, Metz (Moselle), France.

Shock-absorbing or damping and purifying devices for use in the pouring of moulds, applicable to both top and bottom casting. A float, arranged so that its horizontal sectional area is capable of being varied, is combined with expanding means for acting on this float, so as to tend to increase the sectional area.

Law Cases

Foreman's Contributory Negligence

Damages of £1,500 with costs, were awarded at Birmingham Assizes to a foundry foreman who had molten metal at a temperature of 1,200 deg. C. run on to his right foot. Mr. Harry Forgham (57) claimed damages from the Idoson Motor Cylinder Company, Limited, Tipton (Staffs), for negligence. The company denied liability and alleged contributory negligence.

Giving judgment, Mr. Commissioner Moloney said that the men in the foundry were engaged on a rush job and Mr. Forgham, who was an assiduous foreman and anxious to give a hand, was standing close to the mould when molten metal ran out on to his foot causing serious injury.

Mr. Forgham's case was that molten metal could run out through any of a number of reasons, all of which were under the control of the moulder and could be avoided by sufficient care being taken in the construction of the mould. The firm argued that such happenings could not be avoided in foundries and were due to causes which no degree of care could prevent.

The commissioner said he found that the probable cause of this accident was that the moulder had not properly rammed the sand so as to consolidate it at all points. From the safety point of view, this was a most important part of the moulder's job, and he did not accept the suggestion, made by the defence, that a moulder could be doing his job properly and still leave a weak point in the sand.

Nor could he accept that it was one of the risks of the trade to be taken with a shrug of the shoulders. In the face of such obvious danger, the standard of care exercized by the employers and workmen should be nothing less than the highest.

He found that Mr. Forgham was standing with his right foot too close to the mould when the metal ran out. That momentary inattention and lack of care which he should have observed played a major part in involving him in the injury. Full damages would have been £3,000, but he found that contributory negligence by the plaintiff reduced these by half.

Stepped into Molten Zinc

A steel erector, who suffered a "terrifying accident" in 1955 when he stepped into a tank of molten zinc at a Halesowen factory, was awarded £3,250 damages (including special damages of £1,250) against Stewarts and Lloyds, Limited, the occupiers of the factory, at Birmingham Assizes. He was Mr. Patrick Bradley (27) and he alleged negligence on the part of his employers, Joseph Houston & Sons, Acocks Green, Birmingham, and Stewarts and Lloyds.

The allegations were denied and contributory negligence was alleged against Mr. Bradley.

Mr. Justice Finnemore said that the tank was covered except for an area of 3 ft. or 4 ft. at the end where Mr. Bradley happened to be standing. Thinking it was a solid surface he stepped forward. The zinc was covered by scum and it was clear from nearly everybody's evidence that a man unaccustomed to these things might have thought he was stepping on to something solid.

The plaintiff had suffered a terrifying accident in which his foot was badly burned and several toes had had to be amputated. He would never be able to run, jump, or play games. The judge found that there was no negligence by Houston & Sons and no contributory negligence.

Parliamentary

Industrial Injuries Amendments

Both sides of the House welcomed the draft Pneumoconiosis and Byssinosis Benefit Amendment Scheme, 1958, introduced on Thursday, July 24, by MR. W. M. F. VANE, Joint Parliamentary Secretary of the Ministry of Pensions and National Insurance.

The scheme followed the recommendation of the Franks Committee and, in effect, substituted the adjudication procedure, familiar under the Industrial Injuries Acts, he said. The new procedure would be, first, the cause of death determined by the insurance officer appointed under the Industrial Injuries Act with medical advice, and from his decision a right of appeal would lie to the local appeal tribunal and there could then be a further appeal to the commissioner.

There was no criticism of the Silicosis Medical Board (from which there is no appeal), but, said Mr. Vane, experience had led them to believe that a few people would have been better satisfied if they had been able to exercise a right of appeal.

MR. HAROLD FINCH (Lab.), an expert on miners' occupational diseases, gave the scheme his blessing and said it would be welcomed by a large section of workers, particularly in the mining industry. The scheme was putting right an anomaly which had created a great deal of hardship and a sense of injustice, said LADY MEGAN LLOYD GEORGE (Lab.). She hoped it would act retrospectively so that claims which had already been turned down would be considered again.

Cases which had been decided under the existing arrangements would be continued as decided finally, MR. VANE replied. There was no question of appeal from the pneumoconiosis medical board's decision,

Deputation on Blackness Foundry Closing

"It would be much easier for the owners of Blackness Foundry, Dundee—Urquhart Lindsay & Robertson Orchar, Limited (a subsidiary of Fairbairn Lawson Combe Barbour, Limited, Leeds)—to dispose of it for productive use by another concern if it could be announced that any firm interested in taking it over would be able to apply for a Government assistance under the Distribution of Industry Acts." This submission was made by a deputation which went to the Scottish Office in London last week to discuss the proposed closing of the Blackness Works.

The deputation said that it was accepted that the closing of the foundry was inevitable. Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade, promised that his department would consider the suggestion at once and would get in touch with the chairman of the company. Mr. J. S. Maclay, Secretary of State for Scotland, said that the Scottish Council (Development and Industry) was in touch with several firms who might be interested in taking over the foundry. The closing of the Blackness Works, it was claimed, would throw more than 500 men out of work.

The deputation, which comprised the Lord Provost of Dundee, Mr. William Hughes, the city's two MPs, Mr. John Strachey and Mr. G. M. Thomson, and Mr. John Boyd, Scottish officer of the AEU, was told that over 2,500 jobs should be available in the area early next year from six Government-financed building projects already approved and two privately-financed industrial development plans.

Imports and Exports of Iron and Steel in June

The following tables, based on Board of Trade returns, gives figures of imports and exports of iron and steel in June. Totals for the first six months of this year and last are also included.

Total Exports of Iron and Steel

Destination.	Month ended June 30.	Six months ended June 30.	
	1958.	1957.	1958.
	Tons.	Tons.	Tons.
Channel Islands	221	1,888	2,140
Cyprus	488	5,847	3,476
Sierra Leone	1,151	6,989	6,695
Ghana	593	12,052	7,042
Nigeria	3,719	26,353	29,450
Union of South Africa	7,795	56,437	56,834
Rhodesia and Nyasaland	2,510	35,360	21,943
Tanganyika	453	11,452	6,368
Kenya	1,751	26,808	24,309
Uganda	202	2,053	1,505
Mauritius	142	1,874	2,079
Aden	69	2,608	1,660
Bahrein, Qatar, and Trucial States	555	7,313	4,732
Kuwait	3,030	15,998	22,788
India	10,363	144,977	69,649
Pakistan	2,652	31,884	38,815
Singapore	2,288	20,785	17,936
Malaya	1,295	19,279	8,351
Ceylon	1,695	15,013	16,298
British North Borneo	14	2,120	1,234
Hongkong	3,556	49,643	26,905
Australia	8,697	102,916	45,292
New Zealand	12,108	99,724	90,736
Canada	15,931	144,261	97,059
Jamaica	1,023	12,396	9,623
Trinidad	3,769	23,828	27,035
British Guiana	355	3,510	3,851
Other Commonwealth countries	1,441	16,418	16,200
Eire	3,255	22,111	26,257
Finland	3,634	47,524	24,207
Sweden	5,726	59,817	69,507
Norway	6,150	61,003	50,023
Denmark	6,077	58,271	47,368
Western Germany	4,998	6,454	15,923
Netherlands	8,911	58,431	43,014
Belgium	2,069	21,631	13,018
France	92	9,980	1,472
Switzerland	928	10,239	5,727
Portugal	1,235	10,904	7,837
Spain	2,616	22,917	27,148
Italy	2,452	25,875	23,229
Austria	478	2,121	6,006
Yugoslavia	77	4,857	2,340
Greece	398	5,395	7,484
Turkey	425	3,042	2,799
Netherlands Antilles	103	2,166	889
Portuguese East Africa	157	2,559	1,301
Egypt	201	469	9,966
Sudan	2,233	10,191	20,350
Lebanon	36	3,169	8,070
Israel	925	2,602	4,449
Saudi Arabia	168	2,735	3,218
Iraq	2,442	20,298	19,348
Iran	4,320	34,990	18,050
Burma	1,184	11,284	5,465
Thailand	133	4,078	3,324
Indonesia	15	4,251	1,242
Philippine Republic	84	1,125	1,664
USA	7,141	26,218	39,910
Cuba	171	5,064	2,847
Colombia	720	2,862	4,192
Venezuela	4,185	55,537	47,045
Ecuador	147	1,453	1,830
Peru	310	6,272	6,026
Uruguay	60	4,200	662
Argentina	12,667	42,104	77,033
Other foreign countries	7,869	72,213	65,743
TOTAL	182,658	1,649,196	1,373,988

Total Imports of Iron and Steel

From	Month ended June 30.	Six months ended June 30.	
	1958.	1957.	1958.
	Tons.	Tons.	Tons.
Rhodesia and Nyasaland	809	2,586	3,669
Canada	1,288	27,595	10,128
Other Commonwealth countries and Eire	2,493	12,977	12,083
Soviet Union	34,951	139,780	97,504
Sweden	3,126	16,626	18,169
Norway	7,781	61,651	41,427
Poland	—	6,468	15
Western Germany	3,507	54,722	44,724
Netherlands	15,303	24,943	75,043
Belgium	4,540	91,587	43,476
Luxembourg	325	16,647	4,286
France	2,393	35,905	12,667
Italy	592	1,452	2,827
Austria	458	41,973	2,432
Japan	309	7,600	1,583
USA	8,611	104,665	111,934
Other foreign countries	208	14,686	2,675
TOTAL	86,694	661,863	484,642
Iron and steel scrap and waste, fit only for the recovery of metal	3,033	393,320	52,441

Exports of Iron and Steel, by Products

Product.	Month ended June 30.	Six months ended June 30.	
	1958.	1957.	1958.
	Tons.	Tons.	Tons.
Pig-iron	14,127	71,817	63,404
Ferro-columbium (niobium)	2	70	19
Ferro-tungsten	125	355	360
Other ferro-alloys	477	1,641	1,738
Ingots blooms, billets, slabs, sheets, and tinplate bars	694	690	6,026
Iron bars, rods, angles, shapes, and sections	104	1,061	749
Steel bars, rods, angles, sections, and shapes	22,595	271,238	183,078
Iron plates and sheets	7	91	1,819
Universal plates	88	3,916	2,938
Steel plates, ⅛ in. and under ¼ in.	353	5,691	3,609
Ditto, ¼ in. and over	11,108	102,878	101,494
Blacksheets and blackplate	17,829	172,509	151,523
Hoop and strip	4,021	49,525	29,962
Tinplate	29,058	212,374	179,191
Decorated tinplate	131	2,494	1,359
Galvanized sheets	4,991	107,428	35,900
Other (incl. tinned sheets, terne-plate and ternesheets)	858	10,841	6,865
Railway and tramway construction material	17,178	139,812	124,477
Wire rods of steel (incl. alloy steel)*	1,752	30,721	18,543
Wire	8,650	55,684	53,126
Tubes, pipes, and fittings	47,377	402,056	397,936
Iron castings	522	882	4,223
Steel castings	158	1,377	1,492
Forgings	453	4,045	4,067
TOTAL	182,658	1,649,196	1,373,988

* The figures for 1958 are not completely comparable with those for previous years.

DELIVERIES of diesel-electric locomotives to the British Transport Commission by the Brush Electrical Engineering Company, Limited, are running ahead of schedule. The next locomotive to be handed over will be nine weeks earlier than scheduled.

VICTORIAN RAILWAYS has awarded a contract for the supply of equipment for a second batch of 30 electric trains being built in Melbourne as part of a rehabilitation plan, to the English Electric Company of Australia, Limited. The value of the contract is £A1,680,000.

Foundry Exhibition 1959

As previously announced, the Foundry Exhibition, 1959, which is being sponsored by the Foundry Trades' Equipment & Supplies Association, Limited, will be held at Bingley Hall, Birmingham, from May 21 to 30, 1959. Applications for space have already been received from the following members of that Association: Acme Conveyors, Limited; Air Control Installations, Limited; Wm. Aske & Company, Limited; August's, Limited; Bradley & Foster, Limited; British Moulding Machine Company, Limited; British Foundry Units, Limited; Birlec, Limited; Baker Perkins, Limited; F. J. Ballard & Company, Limited; British Industrial Sand, Limited; Carborundum Company, Limited; Constructional Engineering Company, Limited; Electromagnets, Limited; Fletcher Miller, Limited; Foundry Plant & Machinery, Limited; F. & M. Supplies, Limited; Fordath Engineering Company, Limited; Foundry Services, Limited; Fullers' Earth Union, Limited; Foundry Suppliers, Limited; W. J. Hooker, Limited; Hepburn Conveyor Company, Limited; Harborough Construction Company, Limited; Incandescent Heat Company, Limited; J. W. Jackman & Company, Limited; Keith Blackman, Limited; Luke & Spencer, Limited; E. S. Lord, Limited; Monometer Manufacturing Company, Limited; Midland Tar Distillers, Limited; Marco Conveyor & Engineering Company, Limited; Morgan Crucible Company, Limited; Modern Furnaces & Stoves, Limited; Newton Collins, Limited; Pneulec, Limited; G. Perry & Sons, Limited; Paterson Hughes Engineering Company, Limited; F. E. Rowland & Company, Limited; Rapid Magnetic Machines, Limited; Spencer & Halstead, Limited; Sterling Foundry Specialties, Limited; Sternol, Limited; Tilghman's, Limited; Universal Pattern & Precision Engineering Company, Limited.

Other firms from whom enquiries have been received include: Alexander Cardew, Limited; Catalin, Limited; Dohm. Limited; Dallow, Lambert & Company, Limited; Ernest Fairbairn, Limited; Gibbons (Dudley), Limited; Lees, Hall & Sons, Limited, and Richards Structural Steel Company, Limited. Allocations to applicants for space are proceeding and details concerning the Exhibition may be obtained direct from the organizers, Herbert Daniel Exhibitions, Limited, 3, Clifford Street, London, W.1. If not already received, copies of the prospectus, plan of the Exhibition Hall and application forms for space will be forwarded by them, on request. FOUNDRY TRADE JOURNAL staff will be available during the whole run of the exhibition to offer services in a consultative capacity, probably sharing stand accommodation with the secretariat of the Foundry Trades Equipment and Supplies Association.

New Mg-base Alloys

J. Stone & Company (Charlton), Limited, members of the J. Stone (Holdings) Group, report the introduction of new magnesium-base alloys containing silver, rare-earth metals and zirconium and designated "M.S.R." alloys. The potential usefulness of alloys of this type in both cast and wrought forms has been established, but the present announcement refers specially to compositions intended for casting. These alloys—there are two variants, M.S.R. (*A*) and M.S.R. (*B*)—are distinguished by proof stress values at levels hitherto attainable only with aluminium-base alloys. The properties of the alloy are developed by two stage heat-treatment and, as with other age-hardening systems, a variety of combinations of proof stress and elongation is possible by adjustment of heat-treatment conditions or composition, or both. Proof stresses up to 13½ tons per sq. in. are attainable with a low ductility, but castings are currently being offered in material conforming to two tentative specifications which are as follows:—

		A	*B*
0.1 per cent. Proof stress (tons per sq. in.)	... Not less than ...	10	11
Ultimate tensile stress (tons per sq. in.)	... Not less than ...	15	15
Elongation, per cent.	... Not less than ...	4	2

The "M.S.R." alloys have a density of 1.82 gm. per cub. cm. They exhibit a good resistance to creep at temperatures of the order of 200 deg. C., and a knowledge of their metallurgical make-up suggests that they should perform well in tensile or short-term creep tests at elevated temperatures. The suitability of the alloys to engine and other castings subjected to long-term heating, or to missile components where short-term heating applies, is apparent. The alloys have good casting qualities and are fully weldable. They are not liable to stress-corrosion failure. The M.S.R. alloys contain zirconium and fall within the broad coverage of certain alloy and process patents owned by Magnesium Elektron, Limited, under which J. Stone & Co. (Charlton) are licensed.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone : CHAncery 4411, ext. 738 or 771), unless otherwise stated.

KINCARDINE, September 2—Requirements for Bogindollo water scheme include providing and laying about 700 yd. 9-in. spun-iron pipe at Garvock. Documents from Crouch & Hogg, 18, Woodside Crescent, Glasgow, C.3. Deposit £5 5s. 0d.

HITCHIN—Requirements include furnishing and laying of 900 yd. 3-in. spun-iron supply main. Contractors are requested to send their names and addresses to D. Balfour & Sons, 131, Victoria Street, London, S.W.1, accompanied by cheque deposit of £10, made payable to the Hitchin Rural District Council, not later than August 30.

NEWCASTLE, EMLYN, August 30—Supplying, laying and jointing of approximately 410 yd. 6-in. dia., and 90 yd. 4-in. dia. spun-iron rising mains in connection with Llandyssul/Pontwelly sewerage scheme. Documents from J. Owen Parry & Lewis Ammanford, Carms. Deposit £5 5s. 0d.

MORECAMBE AND HEYSHAM, August 29—Construction of about 900 lin. yd. of reinforced concrete, glazed stoneware and spun-iron pipe sewers varying in dia. from 24 in. to 6 in., with manholes, and about 250 lin. yd. spun-iron rising main. Documents from A. H. S. Waters & Partners, 25, Temple Row, Birmingham, 2. Deposit £3 3s. 0d.

INCE-IN-MAKERFIELD, September 1—In connection with Chemical Fields extension housing site, requirements include providing and laying approximately 440 lin. yd. 4-in. dia. cast-iron pipes. Documents from the Engineer and Surveyor, Town Hall, Ince Green Lane, Ince-in-Makerfield, near Wigan.

BELGIAN CONGO, September 1—Machinery and tools. (ESB/18567/58.)

PORTUGUESE EAST AFRICA, September 8—Mineral and coal loading shovels. (ESB/19051/58.)

SALVADOR, August 13—Portable electric cookers. (ESB/19214/58.)

IBF Golf Meeting: September 27 and 28

Those members of the IBF Golfing Society who intend to participate in this year's event at Woodhall Spa but who have not yet returned booking forms to the secretary (Mr. G. W. Nicholls, Modern Foundries, Limited, Highroad Well, Halifax), should do so immediately.

Pig-iron and Steel Production

Statistical Summary of May Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in May. Table 3, weekly average production of finished steel in April. Table 4 gives the production of pig-iron and ferro-alloys in May, and furnaces in blast. (All figures are weekly averages in thousands of tons.)

TABLE 1.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials excl. fuel[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1956	296	453	542	312	272	264	253	216	27	397	318	1,444
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958—Feb. ..	345	509	488	295	313	260	273	226	13	427	332	1,395
Mar. ..	341	511	482	285	305	258	268	233	13	432	329	1,412
April[4]	341	506	477	270	291	243	257	218	11	408	303	1,467
May ..	341	497	473	271	266	229	250	202	9	379	—	1,444

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in May*, 1958. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbyshire, Leics, Notts, Northants and Essex ..	—	4.5	10.9 (basic)	1.8	0.1	16.0	1.3	17.3
Lancs (excl. N.W. Coast). Denbigh, Flints, and Cheshire	1.7	33.3	—	2.6	0.3	36.6	1.3	37.9
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	45.3	—	—	0.1	45.3	0.1	45.4
North East Coast	0.8	76.6	—	1.2	0.4	77.3	1.7	79.0
Scotland	1.9	38.8	—	2.6	0.1	41.3	2.1	43.4
Staffs, Salop, Worcs, and Warwickshire	—	16.9	—	2.0	0.7	17.9	1.7	19.6
South Wales and Monmouthshire	1.9	74.8	7.7 (basic)	0.8	0.1	84.8	0.5	85.3
Sheffield (incl. small quantity in Manchester) ..	8.4	25.9	—	9.7	0.3	42.6	1.7	44.3
North-West Coast	0.1	1.0	5.1 (acid)	0.5	0.1	6.7	0.1	6.8
Total	14.8	317.1	23.7	21.2	2.2	368.5	10.5	379.0
April, 1958[4]	15.3	346.2	21.6	22.2	2.5	386.8	11.0	407.8
May, 1957[4]	21.1	367.7	26.4	25.1	2.9	430.7	12.5	443.2

TABLE 3.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1956.	1957.	1957.	1958.	
			April	March.	April.*
Non-alloy steel:					
Ingots, blooms, billets and slabs[5]	4.7	5.0	4.5	5.2	5.1
Heavy rails ..	9.7	11.2	11.2	11.4	11.8
Sleepers	1.1	1.3	1.9	0.7	1.5
Fishplates and soleplates	0.7	0.8	0.7	1.0	0.9
Plates, 3 mm. thick and over:	50.2	54.3	53.6	55.9	52.1
Other heavy prod.	50.3	53.0	55.3	56.8	54.7
Ferro-conc. bars, rods	7.8	8.8	9.1	8.2	6.9
Wire rods	22.9	23.3	20.6	22.7	18.8
Arches, etc. ..	10.1	11.0	11.6	10.4	10.4
Other light sections	41.4	38.8	37.6	33.0	30.5
Bright steel bars ..	8.0	7.0	6.7	7.1	6.2
Hot-rolled strip ..	24.5	23.1	22.9	25.0	22.0
Cold-rolled strip ..	7.5	7.1	6.5	8.5	7.3
Sheets, incl. coated:					
(i) Hot rolled .	15.0	13.0	11.9	12.1	11.5
(ii) Cold reduced	24.8	29.1	27.0	32.0	29.2
Tin and terneplate	15.6	18.8	21.3	17.3	19.6
Blackplate ..	1.3	1.0	0.9	1.0	0.9
Tubes under 16 in.	26.2	22.1	22.8	22.1	18.3
Tube, pipe fittings	0.5	0.5	0.5	0.4	0.3
Tyres, wheels, axles	4.6	5.1	4.5	5.8	5.0
Forgings (excl. drop)	3.0	3.1	3.1	3.1	2.8
Steel castings ..	4.5	4.6	4.1	5.3	4.3
Tool steel	0.3	0.3	0.3	0.3	0.2
Total	335.0	342.3	338.6	345.3	320.3
Alloy steel	17.3	17.8	16.2	20.9	16.1
Total deliveries from U.K. production[6]	352.3	360.1	354.8	366.2	336.4
Add: Imported finished steel ..	19.5	9.6	7.5	10.9	7.2
Deduct: Intra-industry conversion[7] ..	371.8 55.2	369.7 48.1	362.3 46.3	377.1 48.9	343.6 41.8
Total deliveries new material	316.6	321.6	316.0	328.2	301.8

TABLE 4. —*Production of Pig-iron and Ferry-alloys during May*, 1958

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbyshire, Leics. Notts., Northants and Essex	21	—	16.8	22.7	0.2	—	39.7
Lancs. (excl N.W. Coast.) Denbigh. Flints. and Cheshire ..	5	—	13.8	—	—	1.7	15.5
Yorks (excl. N.E. Coast and Sheffield) ..	—	—	—	—	—	—	—
Lincolnshire ..	10	—	39.6	—	—	—	39.6
North-East Coast	19	4.6	51.9	—	—	1.0	57.5
Scotland	9	0.7	17.9	1.5	—	—	20.1
Staffs., Salop, Worcs., and Warwickshire	5	—	8.0	1.6	—	—	9.6
South Wales and Monmouthshire	11	3.4	44.1	—	—	—	47.5
Sheffield ..	2	—	2.9	—	—	—	2.9
North-West Coast	8	15.2	—	0.2	—	1.8	17.2
Total ..	90	23.9	195.0	26.0	0.2	4.5	249.6
April, 1958[4] ..	91	26.1	202.5	24.1	0.6	3.6	256.9
May, 1957[4] ..	101	30.6	226.8	23.4	0.5	2.2	283.5

[1] Used in non-food manufacturing industries.
[2] Weekly average of calendar month.
[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.
[4] Five weeks all tables.
[5] Other than for conversion into any other form of finished steel listed.
[6] Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table.

Raw Material Markets

Iron and Steel

A large number of foundries are still closed for holidays. Many consumers of castings are also affected by holiday influences, but the suspension in deliveries will not cause any serious difficulties, as their schedules of requirements have allowed for this period. The suspension of deliveries, however, will mean an increased tonnage of pig-iron going into stock. Producers already hold substantial tonnages of all grades of pig-iron, and the amounts on hand have increased considerably during the last few months. The suppliers of scrap and some brands of foundry and furnace coke have appreciable stocks on hand, due to the lessened demand.

Although the foundries have no excess tonnages of raw materials, they are assured of adequate supplies when they reopen, and are hoping that their order-books will show improvement to enable them to take up increased tonnages. The engineering and speciality foundries are fairly well committed, although the demands recently made upon them are not so heavy as they were a few months ago. The motor-car trade keeps up its demand, although orders for castings for commercial vehicles are reduced. The machine-tool trade is steady, but it is not yet taking up the same quantities of castings as it was some time ago, and this also applies to some of the engineering concerns. Overall demands for high-duty castings will, however, enable the engineering foundries to continue to obtain good outputs when holidays are completed.

The light, jobbing, and textile foundries continue to hope and strive for increased business, which has evaded them for so long. Order-books are lean, and, so far as can be seen at present, there is little sign of improvement, although the relaxation of the financial restrictions is a step in the right direction, especially for such trades as the domestic equipment and building trades.

Most of the re-rollers are now taking their annual holidays, and with the small amount of work on hand, the closure will not cause any upset. Demand for all their products shows no improvement and is on a fluctuating scale, although recently there appears to have been a slightly better demand for small bars and light sections. This has been evident in the increased call from some units for small billets, but whether it will be maintained remains to be seen. Generally, the demand for steel semis is quiet, and home steelworks are able to satisfy the call without difficulty, their potential output being much in excess of demand.

Non-ferrous Metals

There is a great deal of news to report this week which directly affects non-ferrous metal markets. In copper, the London market has been consistently firm and the price is now at its highest for nearly a year. The strong undertone and gradual rise in the quotation has been due to the satisfactory demand from the UK, strong buying from the Continent, and purchases believed to be on behalf of US interests. The general improvement has been assisted by the continued decline in stocks, the better outlook for the US economy, and by the unsettled international situation in that selling has dried up.

The strength of the market in London and the strong belief in American metal circles that the US stockpiling programme for 150,000 tons of copper at prices up to 27½ cents will begin in September, has led the US custom smelters to raise their quotation by ¼ cent to 27 cents a pound. US primary producers have left their price unchanged at 26 cents a pound. The outlook, despite the uncertainties about the summit talks and the Middle East situation (although recognition of Iraq by the UK and the US has helped) is hopeful. Aside from the stockpiling programme mentioned above, copper producers are taking an optimistic view of the results arising from lifting the embargo on goods to Communist countries on August 15 and hope more copper will be purchased from those sources. Also the exploratory international copper conference proposed by a working committee of the United Nations will take place in September and, finally, opinion is hopefully looking for a mild economic recovery in the US over the next four months. All things considered, therefore, it is possible that the copper market will be able to at least hold its own over the coming months and may well continue to go ahead.

The tin market is only modestly steady, with the cash price once more back at the support level of £730 a ton. It is understood that the Soviet Union has now replied to the International Tin Council's invitation for the USSR to become a producer member. The Soviet Union has, it is said, refused the offer on the basis that she is also an importer of tin and that her best plan would be to send observers to the council meetings. This has placed the council in somewhat of a quandry; while some members of the council feel a half loaf is better than no loaf at all, there are those who feel that according Russia "observer" status is pointless and that unless she is prepared to join and accept the quota restrictions it is best to leave the USSR out altogether. In the meantime, the market in America continues slow and the price is around 95½ cents a pound.

Lead is a quiet market both here and in the United States. The Board of Trade has stated that the United Kingdom has accepted the invitation by the United Nations to attend two conferences to be held in London in September on the general developments in international trade in copper and in lead and zinc. In the light of the findings will depend whether any action is to be taken. The US price is unchanged at 11 cents a pound.

Iron-ore Imports

Iron-ore imports in June, and the totals for the first six months of this year and last, are shown below.

From	Month ended June 30.	Six months ended June 30.	
	1958.	1957.	1958.
	Tons.	Tons.	Tons.
Sierra Leone	65,805	360,959	406,137
Canada	417,065	682,872	794,871
Other Commonwealth countries and Eire	494	7,805	2,319
Sweden	240,410	1,812,174	1,732,442
Norway	36,788	111,980	160,148
Western Germany	—	17	5,010
France	41,039	308,482	268,997
Portugal	7,950	71,515	75,317
Spain	62,606	507,141	366,008
Algeria	149,855	738,920	859,248
French West Africa	32,083	337,955	257,387
Tunisia	71,673	411,909	335,255
Northern Morocco	11,360	122,562	83,006
Southern Morocco	41,584	173,842	229,046
Liberia	41,580	201,647	170,589
Venezuela	81,003	565,164	847,590
Brazil	35,960	332,255	324,404
Other foreign countries	27,120	36,011	135,439
TOTAL	1,364,375	6,783,210	7,054,113

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

August 6, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £47 0s. 0d. to £47 10s. 0d., scale 17s. 0d. per unit; 75 per cent. Si, £66 0s. 0d. to £66 10s. 0d., scale 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 6s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 9s. 6d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £83 10s. 0d. to £87 0s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £79 10s. 0d. to £85 0s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 2s. 0d. per lb. Cr; 1 per cent. C,* 2s. 0¼d. per lb. Cr; 0.15 per cent. C,* 2s. 1½d. per lb. Cr; 0.10 per cent. C,* 2s. 1¾d. per lb. Cr; 0.06 per cent. C,* 2s. 2d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £78 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £66 16s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £208 5s. 0d. to £208 10s. 0d.; three months, £208 10s. 0d. to £208 15s. 0d.; settlement, £208 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 1s. 11¾d. per lb.; rods, 232s. 9d. per cwt. basis; 20 s.w.g., 266s. 0d. per cwt.

Tin.—Cash, £731 0s. 0d. to £731 10s. 0d.; three months, £736 10s. 0d. to £737 0s. 0d.; settlement, £731 10s. 0d.

Lead (Refined Pig).—First half August, £72 15s. 0d. to £72 17s. 6d.; first half November, £73 10s. 0d. to £73 15s. 0d.

Zinc.—First half August, £64 10s. 0d. to £64 15s. 0d.; first half November, £65 5s. 0d. to £65 7s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £99 0s. 0d.; rolled zinc (boiler plates), all English destinations, £96 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £85 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 7½d. per lb.; sheets to 10 w.g., 171s. 3d. per cwt.; wire, 2s. 5d.; rolled metal, 171s. 3d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £142; B6 (85/15), —; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £170; HTB2 (38 tons), —; HTB 3 (48 tons), £215.

Gunmetal.—BS1400, LG2 (85/5/5/5), £171; LG3 (86/7/5/2), £181; G1 (88/10/2/½), £238; (88/10/2/1), £233.

Phosphor Bronze.—BS1400, PB1 (AID released), £255 per ton.

Phosphor Bronze Strip, etc.—Strip, 254s. 3d. per cwt.; wire, 3s. 9d. per lb.; rods, 3s. 0½d.; tubes, 3s. 0½d.; chill cast bars: solids 3s. 0d.; cored 3s. 1d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 6½d. per lb.; round wire, 10g. in coils (10 per cent.), 3s. 11d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 10d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £79 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £212; AB2, £228.